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Commission on the
Report 1928

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REPORT
OF THE
Royal Commission Investigating
the Fisheries of the Maritime Provinces
and the Magdalen Islands



OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

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Islands, Royal Commission on the

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Royal Commission Investigating the Fisheries of the Maritime Provinces and the Magdalen Islands



OTTAWA
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1928

COMMISSIONERS

Honourable Mr. JUSTICE MACLEAN, *Chairman*

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Secretary.

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Counsel.

OTTAWA, May 4, 1928.

The Honourable P. J. A. CARDIN,
Minister of Marine and Fisheries,
Ottawa, Ont.

SIR,—In compliance with the Commission dated 7th October, 1927, we have the honour to submit our report, wherein we deal with the matters falling under the Terms of our Reference.

We attach as Appendix I, a copy of the Commission, the instructions of which we have kept in mind as indicating the spirit in which it was desired our Terms of Reference should be interpreted.

We have the honour to be, Sir,

Your obedient servants,

A. K. MACLEAN,
CYRUS MACMILLAN,
H. R. L. BILL,
JOSEPH MOMBOURQUETTE,
J. G. ROBICHAUD.

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INTRODUCTION

Upon a Report of the Committee of the Privy Council, approved by the Deputy of His Excellency the Governor General, on the 7th day of October, 1927, we were appointed a Commission under Part I of the Enquiries Act, Chapter 104 of the Revised Statutes of Canada, 1906, with instructions to investigate all phases of the fishing industry of the Maritime Provinces, the Magdalen Islands and the coastal portion of the Province of Quebec, and more particularly to enquire into

1. What should be done to increase the demand for fish both in the home and foreign markets.
2. Whether the spread in the price of fish between the producer and the consumer is excessive, and, if so, what should be done to remedy the condition.
3. What should be done to develop the inshore fisheries to their capacity.
4. Whether there should be any further restriction on steam trawlers operating from Canadian Atlantic ports, and, if so, what they should be.
5. Whether keeping in view that no exceptional privileges are available to Canadian fishing vessels visiting United States ports, the so-called *modus vivendi* privileges, or any of them, should be renewed.
6. Whether or not the amount now annually distributed as fishing bounty should be continued on the present basis.
7. Whether there should be an inspection of fresh fish of all kinds as landed, as placed in storage, and as shipped from the coastal points.
8. Whether there should be an inspection and grading of dried fish.
9. Whether there should be any modifications in the lobster fishery laws and regulations.

We were directed to report with recommendations to the Minister of Marine and Fisheries on the above specific matters and to enquire into and report upon the general condition of the fishing industry, how existing conditions of the fisheries and fishermen might be improved and how the industry might be further developed with expedition and efficiency.

Such portions of the enquiry as related to the coastal portion of the mainland of the Province of Quebec, was the result of a request, made by the Minister of Colonization, Mines and Fisheries of that Province, that the Commission extend its investigation to the Gaspé Peninsula and the north shore of the Gulf of St. Lawrence. The Province of Quebec controls and administers its fisheries, subject to regulation by the Federal authorities. Although the Magdalen Islands are part of the Province of Quebec, their fisheries, by arrangement with the Government of that Province, are administered by the Federal Department of Marine and Fisheries, and for fishery administration purposes are included within the Maritime Provinces; in our use of the term "Maritime Provinces," it will, therefore, be understood to include the Magdalen Islands. The Minister of Marine and Fisheries advised the Minister of Fisheries of the Province of Quebec that owing to the late date at which the Commission would begin its work, it would be manifestly impracticable for the Commission to visit the north shore of the Gulf of St. Lawrence, but that a meeting would be held at a central point in the Gaspé Peninsula at which representatives of those there interested in the fisheries might appear. The Department of Fisheries of the Province of Quebec was asked to arrange to have representatives from the different sections interested attend this meeting. The first public hearing of the Commission was accordingly held at Gaspé, P.Q., on October 15th last.

Subsequent to the appointment of the Commission, and prior to its formal organization, the Department of Marine and Fisheries, hereafter referred to as the Department, issued instructions to its fishery officers in the Maritime Provinces, advising them that a Commission had been appointed to investigate the conditions and requirements of the fisheries, and directing them to co-operate with the fishermen in their several districts in order to ensure an expression of their views. To each fishery officer there was forwarded a memorandum showing the places at which the Commission would hold hearings, as well as the limits of the district or districts which each meeting was expected to serve. The fishery officers received from the Department printed posters, announcing the appointment of the Commission and its purpose, and containing information as to the date and place of meeting; these they were requested to post prominently throughout their respective districts. In general the fishery officers were instructed to encourage in their respective districts the calling of public meetings of fishermen to discuss the several matters which might or should be brought to the attention of the Commission; they were further instructed to request leading fishermen in each district to call such meetings to determine the nature of the representations to be made, and to select one and not more than two persons, to appear as representatives of all others in the particular locality.

These instructions also informed the fisheries officers that the Department was conscious of the difficulty of having representatives attend the hearing of the Commission because of the travelling and living expenses involved. In order to remove this difficulty, the officers were advised that travelling and living expenses of the properly selected and accredited representatives would be paid by the Department.

The itinerary arranged by the Department prior to the organization of the Commission, was, on the whole, adhered to. It was found necessary to cancel some meetings advertised for certain places, and it was found desirable to hold additional meetings in other places. We were unable to visit the Magdalen Islands, but the delegates there appointed by the fishermen appeared before us at Souris, P.E.I.

The procedure of calling meetings of fishermen in their several communities and having representatives appointed by such meetings to appear before the Commission, and the payment of the travelling and living expenses of such representatives, resulted in a very large number of persons appearing before us. Some such form of organization and procedure was necessary, particularly owing to the late season of the year at which the Commission commenced its work; and while it may have added substantially to the cost of the enquiry, we think it fully accomplished the purpose of affording a reasonable opportunity to all interested in the fisheries to present their views.

Altogether we held forty-nine hearings, many of which extended over several days, and at which 823 persons appeared before us. The report of the proceedings is quite voluminous, filling over 5,700 typewritten pages. In addition to the representations made verbally to us, written statements were also filed with us. A great deal of correspondence was also, from time to time, directed to the Commission upon fishery matters, and we had many informal interviews or conferences with persons directly or indirectly interested in the fisheries. We probably received evidence or statements on subjects not strictly within the terms of the reference, but we did not deem it proper to decline to receive any information, even remotely related to the fishing industry, if the person offering it considered it at all relevant. As might be expected, the many subjects brought before us varied in importance; some of them we do not discuss in this report, because they may be more properly and effectively considered by the Department.

I

FISHERY RESOURCES AND EXTENT

The fishing grounds available to Canadian fishermen on the Atlantic coast are probably the most extensive in the world, as is evident from the length of the coastline of the Maritime Provinces and Quebec, and the proximity of the North Atlantic fishing grounds to this coastline. Nova Scotia particularly, is most favourably situated as a base for fishing operations, because of its accessibility to the extensive fishing banks off the south coasts of Nova Scotia and Newfoundland, as well as to other fishing grounds nearer its shores.

It may be of interest to note the principal fishing grounds of the North Atlantic, resorted to by fishing-vessels and steam trawlers from the Atlantic ports of Canada, and by vessels and steam-trawlers from other countries. With their approximate areas, they are as follows:—

	Square Miles
Grand Bank	36,000
Green Bank	1,450
St. Pierre Bank	4,800
Quereau Bank	3,000
Misaine Bank	1,820
The Gully	1,200
Western Bank	6,320
Le Have Bank	790
Le Have Ridges	1,575
Roseway Bank	175
Browns Bank	1,375
Seal Island Ground	1,250
Georges Bank	8,498
South Channel (about)	1,300
Total	69,553

A brief description of some of these fishing banks will perhaps be useful, while their exact location will be seen from the map, appendix II.

The Grand Bank, lying southeast of Newfoundland, is perhaps the most important cod fishing ground in the world, and is frequented by fishing vessels and steam-trawlers from France, Portugal, Spain, United States, Newfoundland and the Maritime Provinces of Canada. It is in the form of an irregular triangle, one side of which is 264 miles, another 225 miles and the third 264 miles long. Green Bank lies between Grand Bank and St. Pierre Bank; a portion of it is regarded as an excellent halibut ground, although cod are also taken there in considerable quantities. It is 62 miles long and 36 miles wide. The fishing season here is usually from April to October. St. Pierre Bank is only about 10 miles distant from the Islands of St. Pierre and Miquelon. Cod and halibut are found here in considerable quantities, but it is not often resorted to by Canadian vessels seeking cod. It is 125 miles long and its width varies from 35 to 65 miles. The fishing season on this bank begins about the first of April and extends into November. Quereau Bank is an important fishing area, some 120 miles by 47 miles in extent. Cod and halibut are the principal fish taken here but haddock and hake are also abundant. Sable Island Bank, or Western Bank, lies east and south of the mainland of Nova Scotia, and is a well known and important fishing ground. It is about 156 miles long and 76 miles wide, Sable Island being at its eastern end. Cod and halibut are the principal fish taken here, the former being most abundant from March to June, although taken in quantities in later months. Haddock are also found here in substantial proportions. Le Have Bank, lying off the southwest of Nova Scotia, is a relatively small fishing ground. Cod and haddock are the principal fish taken

there, and they are most abundant in the early winter months, although they are to be found in all seasons of the year. It is 52 miles long by 54 miles wide. Le Have Ridges is a continuation of the same ground, but apparently haddock are not there to be found in any great quantities. It has a length of 45 miles. Roseway Bank lies to the west of Le Have Bank, and is about 21 miles by 15 miles in area. Cod and haddock are the principal fish taken on this fishing ground. Georges Bank is the most important and largest fishing ground near the United States coast, and is about 150 miles by 98 miles in extent. Cod and haddock are particularly abundant in parts of these grounds during the months of February, March and April. Browns Bank is separated from Georges Bank by 15 miles only, and is some 63 miles by 43 miles in extent. Cod, haddock and halibut are the principal fish taken there. Seal Island Ground, about 35 miles in extent, lies between Browns Bank and Seal Island, and is much frequented by Nova Scotian vessels. Cod and haddock are the principal fish there taken. South Channel is practically an extension of Georges Bank, and is much resorted to by the Boston and Gloucester fleets; this fishing ground is particularly prolific in haddock; and, being near United States fishing ports, is therefore, of special value in the production of fresh haddock for the United States markets. (a) In addition to these fishing banks there are other well known fishing grounds near the Atlantic coast, and in the Gulf of St. Lawrence waters.

These banks, embracing an area of nearly 70,000 square miles, have yielded annually on the average for thirty years past, more than eleven hundred million pounds of cod alone, and here undoubtedly is to be found the greatest cod and haddock fishery in the world.

Vessels from Nova Scotia, Newfoundland, the United States, France, Spain and Portugal, frequent these fishing grounds. In 1927 the fishing fleet on these banks, other than Georges, numbered more than 350 vessels, including steam-trawlers, and was manned by more than 10,000 men.

Inclusive of some of the fishing banks already mentioned, where cod and haddock are the principal products, there is around and adjacent to the Maritime Provinces a total ocean fishing area of approximately two hundred thousand square miles, or over four-fifths of the entire ocean fishing area of the North Atlantic. Fifteen thousand square miles of inshore fishing waters are controlled entirely by the Government of Canada. The commercial products of these extensive areas consist for the most part of cod, haddock, hake, herring, halibut, pollock, mackerel, sardines, salmon, smelts, alewives, swordfish, tuna and shellfish, principally lobsters, scallops, oysters and clams. The average yearly value of the catch in the Maritime Provinces from 1921 to 1926 inclusive was over \$16,000,000 or over 37 per cent of the value of the total catch of all fish taken in Canada during that period. In 1926 the value of the catch was nearly \$20,000,000. In that year the capital invested in equipment for fishing such as boats, nets, traps and general gear was \$12,700,000, or about 45 per cent of the total capital invested in Canada for such equipment. The capital invested in canning factories and curing establishments was approximately \$6,000,000. The total capital invested in the fishing industry in primary and secondary operations was nearly \$19,000,000, or over 35 per cent of the total investment in the Canadian fishing industry. The total number of persons engaged in the fishing industry of the Maritime Provinces in 1927 was over 40,000, or 50 per cent of the total number employed in the industry in all Canada. The fishing industry may therefore be regarded not only as of vital importance to the Maritime Provinces but also as a most valuable asset to Canada.

(a) House of Representatives' Document No. 1519.

The following table shows the value of the fisheries in each of the Maritime Provinces and at the Magdalen Islands in certain years:—

Year	Nova Scotia	New Brunswick	Prince Edward Island	Magdalen Islands	Total
	\$	\$	\$	\$	\$
1887.....	8,379,782	3,559,507	1,037,426	418,069	13,394,784
1897.....	8,090,346	3,934,135	954,946	299,510	13,278,940
1907.....	7,632,330	5,300,564	1,492,695	240,221	14,665,810
1926.....	12,505,922	5,325,424	1,358,934	633,223	19,823,553

II

CONDITIONS IN 1927

The report of the Committee of the Privy Council appointing this Commission observed that during the latter part of 1926, and the winter months of 1927, the weather conditions on the Atlantic coast were particularly favourable for fishing. The result was that the quantity of fish landed during that time was greater than the demands of the market and greater than in any corresponding period for many years previously. This was also true of the inland fisheries. The favourable weather of this period also enabled steam trawlers to land larger catches than usual. The report further observed that by reason of the low level of prices paid to fishermen in the spring and summer of 1927, particularly in eastern Nova Scotia, the fisherman was not receiving a reasonable return for his labour.

It is quite clear, we think, that in the period mentioned there was an unusual quantity of fresh fish on the market, with the result that there was an excess of supply, and keen competitive selling. This market condition was not wholly attributable to overproduction by those normally engaged in the production of fresh fish. The salt fish trade in 1926 was unusually unremunerative, and this variety of fish was being sold at the lowest price in many years. A consequence of this condition of the dried fish trade, was the encouragement of a number of shore and offshore fishermen to engage in the fresh fish trade, and to abandon the dried and pickled fish trade. In the Digby-Annapolis section of Nova Scotia, the hake, taken largely in summer and usually salted for South American markets, came into the Canadian fresh fish markets, because it was displaced in the South American markets by low priced dried cod from Norway and Scotland. It is also said that in the fall of 1926, and the following winter months, large shippers of fresh fish from Nova Scotia experienced unexpected competition in certain markets of the western United States, from United States producers. This turned into the Canadian market considerable quantities of fish that had been intended for the United States. Whatever may have been the causes contributing to this situation, and they were many, they resulted in price cutting, unprofitable alike to shippers and fishermen.

III

THE FISHING INDUSTRY

1. LOBSTERS

The lobster industry is one of the most important and most valuable branches of the fisheries of the Maritime Provinces and Quebec. In the past season 1927, the total production was 31,198,500 lbs. Of this catch approximately 23,000,000 lbs. were packed as canned lobsters, which at an average of 200 lbs. of live lobsters to a case, made 115,114 cases. The remainder of the

catch, approximately 8,200,000 lbs. was shipped in the shell. The total value to the fishermen was approximately \$3,888,136. As the price paid for live lobsters for shipment averaged about twenty-five cents a pound and that paid for lobsters for canning about eight cents, the live lobster industry brought to the fishermen approximately \$2,050,000, and the canning industry about \$1,840,000, the former being much more remunerative. There were 385 canneries in operation—126 in New Brunswick, 126 in Nova Scotia, and 133 in Prince Edward Island. The number of persons engaged in fishing in 1926, that is in primary operations, was 13,768; the number employed in the canneries was 6,501. The total number of traps set was 1,613,974. The total capital invested in traps, factory buildings and equipment was \$3,404,167.

Although in recent years the money value of the industry has kept to a fairly average level the actual catch has greatly declined in quantity. The table in appendix III shows the decrease. The greatest decrease has been in New Brunswick and Prince Edward Island. In Nova Scotia the catch in 1926 was 184,316 cwt., an increase of approximately 4,000 cwt. over the average yearly catch for the past seven years of 180,235 cwt. About three times the number of traps required ten years ago are needed to-day to take one hundred pounds of lobsters. The decrease in the catch and the necessary increase in the number of traps indicate a serious depletion. This depletion is undoubtedly partly due to illegal fishing, that is fishing out of the permitted season, and to the taking of small lobsters and of "berried" or spawn carrying lobsters, all of which will be referred to later.

We do not presume to present here a final solution of the very difficult and intricate problems connected with the lobster fishery, but we venture to express some suggestions and recommendations which may be of assistance to the industry.

1. *Seasons.*—For purposes of administration the sea coast of the Maritime Provinces and Quebec is divided into ten districts numbered from 1 to 9, with a small district in Nova Scotia numbered 4A.* The open fishing season in these districts varies and is determined by considerations of ice conditions and by the known or surmised presence of lobsters in these particular waters at non-spawning periods. Much evidence was placed before us bearing on these various seasons, evidence which asked for slight changes and which on the whole seem to us to be reasonable. In several districts there was no expressed desire and apparently no valid cause for change.

In each of districts 1, 2, 3, 4, 4A, 6, and 9, the present season, in the consensus of opinion expressed to us, is satisfactory and no change would seem to be desirable or necessary. Changes were asked for in districts 5, 7 and 8. District No. 5 in Nova Scotia extends from Cole Harbour eastwards, covering about one-half of the southern coast of the province, thence northward to the northern entrance of the Strait of Canso and including a small part of the southwestern coast of Cape Breton Island. In this district the open season is now from April 20 to June 20. It was stated by many persons in the eastern part of this section that the date of opening is too early because of the almost invariable presence of ice along the coast at that time, particularly in the Strait of Canso and on the southern Cape Breton shore. We, therefore, recommend that the open season in this district be changed to April 30-June 30.

In district No. 7 it was apparent from the mass of evidence submitted to us that because of ice conditions in late April the opening date, April 26th, is too early. Very seldom has the fisherman been able to put out his traps before the first to the fifth of May, and when he has taken the risk, loss of gear and equipment has almost invariably resulted. We recommend that in this district the open season be advanced from April 26th-June 25th to May 1st-June 30th.

* See map, Appendix IV.

District No. 8 presents a difficult problem based on a variety of conflicting opinions expressed by fishermen, canners, and scientists. Here the open season is from August 16th to October 15th. For twenty years previous to 1919 the open season here was from May 25th to August 25th. It was recommended by the Shell Fish Commission of 1912-13 that there should be one season in the entire Northumberland Strait, from April 20th to July 1st. The Advisory Board then in existence supported this recommendation, but no action was taken because of strong representations from fishermen who alleged that in the early spring there were no lobsters in what is now district No. 8, and that fishing in such period would be a useless and profitless undertaking. In 1918 the joint conference of lobster fishermen and canners held at Halifax, N.S., recommended that the open season be changed from May 25-August 10th to August 1st-September 30th. But because of scientific advice that on August 1st the shell of the lobster might not be sufficiently hardened after spawning, the open season was subsequently changed to what it is at present, August 16-October 15. In this district there is relatively little canning other than of small lobsters. The industry is gradually becoming a live lobster industry. Lobsters of nine inches in length and over are shipped alive to the United States and Canadian markets at a time when the supply from other sources is low and at more than double or even treble the price received by fishermen from the canners. The average price last year for live lobsters shipped from this district to the United States market was 25 cents a pound; the average price paid by canners in the district was 8 cents a pound. The catch in Prince Edward Island and in Nova Scotia in this section has kept to a fairly average level in the past five years; the catch on the New Brunswick coast has seriously fallen off. The following statistics are of interest,

—	1923	1924	1925	1926	1927
	cwts.	cwts.	cwts.	cwts.	cwts.
Nova Scotia Coast.....	1,370	1,251	671	978	734
New Brunswick Coast.....	27,436	24,008	20,699	17,913	13,225
Prince Edward Island Coast.....	7,507	7,896	5,886	5,610	6,368

The average yearly catch on the Nova Scotia coast in five years was almost 1,000 cwt. and the catch last year showed a decrease of over 25 per cent below this average. The average yearly catch in New Brunswick in the same period was 23,662 cwt. and the catch last year was over 40 per cent below the average. In Prince Edward Island, the average yearly catch was 6,653 cwt. and the catch last year was approximately up to the average.

It was stated to us by canners that the present season in this district encourages and increases illegal fishing, that during the legal season in No. 8, fishermen in No. 7 continue to ply their trade in their own district, and to dispose of their catch to dealers or packers in No. 8. It was said that fishermen in district No. 7 in New Brunswick fished in the season fixed for No. 8 and disposed of their illegal catch to dealers operating from Prince Edward Island. Other persons declared that the present season encroaches on the spawning period. On the other hand, fishery officers informed us that in Prince Edward Island the fall season in this district has resulted in a marked decrease in illegal fishing. The majority of fishermen in the district asked that the season be changed to August 1st-October 1st, alleging that stormy weather in October made fishing well nigh impossible. With regard to the first argument put forward against the present season, we believe that illegal fishing can be stopped by a rigorous and impartial enforcement of existing laws. We believe that it would be in the interests of the industry to have but one season for the districts Nos.

5, 7 and 8, and that, if considered possible and feasible after investigation, such a uniformity of season should be established. We feel, however, that we have not sufficient evidence on the migration or presence of lobsters in district No. 8 at specific periods, nor have we enough definite evidence on the spawning periods of lobsters in these parts to warrant us in making any recommendation for a sudden or drastic change. We, therefore, recommend that the season remain as it is for the present. We recommend further that, meanwhile, a size limit be fixed in this district beginning in 1929 with 8 inches, advancing in 1930 to 9 inches. The industry here, as we have said, is gradually becoming a live lobster industry, and we are convinced that the fixing of a size limit which will enable the fisherman to sell his whole catch to the live lobster market will in the end not only conserve the lobster, but will prove more remunerative to the fishermen. And we further recommend that the Biological Board be requested to carry out at once a thorough biological and statistical investigation to determine whether or not the present season is injurious to the industry, whether it encroaches on the spawning period, and whether the season could be changed to the spring without hardship or loss to the fishermen. When the investigations have been sufficiently adequate and conclusive, the Department should take such action as it considers advisable. If the result of these investigations indicates that the present season should not be changed to a spring season, we recommend that the limits of the district be extended northward to a line from Escuminac, N.B., to North Cape, P.E.I., a more natural and specific dividing line from district No. 7.

We recommend that all regulations bearing on closed seasons be fixed by statute, so that dates can no longer be changed by the Department to suit individuals or localities or in answer to petitions of either canners or fishermen. We were informed that fishermen, who in one year have already operated in one district frequently move their gear to another district in which the season is later, for the purpose of again in the same year engaging in lobster fishing. It was suggested that this practice be discontinued. We recommend that the Department consider the advisability of making this suggestion effective.

2. *Conservation.*—The great decrease in the lobster catch has been caused by three definite factors, illegal fishing, or fishing during closed seasons, the taking of "berried" or spawn-carrying lobsters, and the catching of small lobsters.

(a) *Illegal Fishing.*—Along some parts of the coast illegal fishing or fishing in the closed season is carried on in open and flagrant manner. Many persons informed us that violations and violators are generally well known and that the former are usually regarded lightly in the community. We were told publicly by reliable witnesses that in some districts the quantity of lobsters caught illegally in the closed season amounted to at least sixty per cent of that caught in the legal period; and we were informed privately that in at least one section the quantity taken in the closed season equalled that taken in the regular legal season. We were told, too, of surreptitious canning and packing in barns and kitchens and woods, of illegal sales of fresh lobsters in local towns, and of even the export of illegally caught lobsters. The impression left on our minds in certain districts was that there was an utter lack of observance of the existing lobster regulations and little individual or community sentiment in support of their enforcement. Nor was there any thought of the future barren period which must inevitably result from the wanton illegal taking of fish. The old fable of killing the goose that lays the golden egg is true to-day of the lobster fishery. Law observance and law enforcement have in some localities been shamefully lax; breaches of the regulations have been too frequently ignored, and violators have too often been allowed to go unpunished because of powerful influences. In one district a fishery guardian was killed in 1926, apparently because his enforcement of the law was considered too strict, and his assailants were never

brought to justice. The fishing of lobsters in the closed seasons can only be prevented by a rigorous and impartial enforcement of existing regulations,—an enforcement which may require the appointment of additional guardians and more numerous and faster patrol boats in some parts. We believe that with such persistent enforcement, after a period of a few years illegal fishing would be reduced to a minimum.

(b) "*Berried*" or *Spawn-carrying Lobsters*.—Evidence showed that "berried" lobsters are frequently sold. In some parts no effort whatsoever is made to protect them. The spawn or "berries" are washed off with a brush or are blown off by the exhaust pipe of the engine, over which the law-breaker holds the lobster. The lobsters thus cleaned of their spawn are sold unnoticed with the legal catch as it is extremely difficult to distinguish them. Regulations against the taking of "berried" lobsters are obviously very difficult to enforce. Protection depends perhaps more on education than on law. The individual fisherman must in some way be made to realize the inevitable disaster which will follow his failure to return to the water the spawn-carrying female. This can only be done by a campaign of education in the various fishing villages not only among the fishermen, but among the school children,—a campaign to which school and press and pulpit should each contribute its share. Destruction frequently results from ignorance of the consequences, rather than from a deliberate breaking of the law. Several persons advocated a regulation similar to that in force in the State of Maine under which the fisherman who takes a "berried" lobster sells such lobster to the dealers at the current rate. The State collects these, reimburses the dealer, punches a hole in the tail or flipper, and releases the lobster. The hole serves as a mark which prevents the lobster from being brought in and sold a second time in the season. We cannot see the fairness of this regulation, which means a bonus for merely obeying the law and for protecting one's own industry. In one district the fishermen at the beginning of the season voluntarily take an oath before the Overseer that they will return "berried" lobsters to the water. In another district each member of a Fishermen's Union promises to protect the "berried" lobster, and he is fined, or after a second offence suspended, if he is caught violating his promise. We believe that the fishermen should take the matter in their own hands. The taking of such an oath or a pledge would doubtless have a restraining influence.

(c) *Size Limit*.—In district 1, a size limit of $10\frac{1}{2}$ inches is in force; in districts Nos. 2, 3, and 4A in the fall season, it is 9 inches. As far as we were able to judge, these regulations are fairly well observed. In other districts there is no size limit and we were told by fishermen that the only size test was "anything with eyes". We recommend that in all the above districts and in district no. 4, where there is now no size limit, a uniform limit of 9 inches be established. If after investigation by the Department it is found that in certain parts of the section included in the above districts the larger size limit would be preferable, the limit should be fixed at $10\frac{1}{2}$ inches. In district 4A the limit of 9 inches applies only in the fall season of December, but as a result of evidence submitted to us and of a petition forwarded by fishermen to the Department, we recommend that the fall size limit apply also to the spring season of March 1st to May 15th, thus ensuring a greater supply of larger lobsters in the fall season when prices in the United States market are usually at the peak. The size limit in the districts where no limit now exists must naturally vary. Where lobsters are on the average smaller because of water temperature conditions the limit must be smaller. In all districts other than those where the limit already exists, and district No. 8 to which we have already referred, we recommend that the minimum size be fixed at six inches the first year, 1929, and that it be advanced one inch each year until it reaches 8 inches, excepting in such dis-

tricts where in the opinion of the Biological Board after observation and thorough investigation it is necessary because of successful breeding to fix a smaller final limit. Because of peculiar conditions, certain waters are more favourable than others for abundant breeding, but the lobster does not reach a large growth. In such places a smaller size limit may be permitted without depleting the fishery.

The Atlantic coast is the premier lobster-producing region in the world, a fact which shows that conditions generally along that coast are suitable for it. The varied conditions found from the Bay of Fundy to the Strait of Belle Isle are not, however, all equally favourable. The more northerly waters, like those along the north shore of the Gulf of St. Lawrence, are somewhat too cold, and those of the New Jersey coast, the southern limit of the lobster's presence, are somewhat too warm, and it is found in but small numbers near both of these limits of its range. Near the middle of its range there are also great differences. In the Bay of Fundy the lobster is comparatively rare and of large average size; this is because of the lack of suitable water for breeding; nearly all the lobsters are consequently immigrants and several years old. In Northumberland Strait on the other side of the neck of land which connects Nova Scotia with New Brunswick, the lobster is of small average size; the waters there, generally shallow and warm in summer, give excellent breeding conditions, and thus assure a plentiful supply of young. As would be expected from this, the Northumberland Strait has a very productive fishery, although not the best on the coast.

The whole lobster-fishing coast has a frontage on gulfs, large bays and open ocean of over two thousand miles, and furnishes an annual catch ranging up to over forty million pounds. Yet a forty-five mile frontage, from Port Maitland, near Yarmouth, to Cape Sable, yields up to five million pounds, or approximately one-sixth of the Canadian Atlantic coast production. In fact for the twenty-year period from 1897 to 1916 inclusive, its yield was almost one-fifth, notwithstanding its nearness to the important markets of the large cities of the United States, which has stimulated very intensive fishing. A combination of conditions has made this possible. The waters generally along that section of the coast are too cold for successful lobster breeding, but in the Tusket region south of Yarmouth there are extensive shallow inlets, the waters of which become quite warm in summer, and furnish ideal conditions for the growth of the fry. On the other hand, the coast generally is rocky, rich in food, and with waters providing most suitable conditions in temperature and salinity for the adults from the shore line to quite a considerable depth. The rugged, exposed nature of the coast makes fishing far from easy; and this, together with the protection furnished by the rocky bottom and the distribution over such a range in depth, serves to prevent any considerable depletion of the stock by over-fishing, and assures to that district by far the best lobster fishery in the world.

Regulative measures for limiting size should, therefore, vary in districts. The comparative lack of suitable breeding conditions in the Bay of Fundy makes it advisable to have a high size limit so that the few lobsters that reach the adult stage, or that immigrate from other waters, may yield as many pounds as possible to the fishermen. In Northumberland Strait and adjacent areas very successful breeding renders it unnecessary to apply such a high size limit; but the water is comparatively so shallow and the bottom so smooth, that over-fishing readily occurs, notwithstanding the large numbers, and there corrective measures are imperative. Near Yarmouth less regulation is needed because of the favourable breeding and growing conditions and because of the natural protection from overfishing. Nevertheless, here also protection is needed, and to an even greater extent along the whole outer coast of Nova Scotia.

The best of the inshore breeding areas, for example the shallow inlets, should be set aside and fishing therein should be prohibited. Where the breeding areas are very limited, as on the outer coast of Nova Scotia, an effort should be made to place the berried females in the warm shallow bays when the fry

are hatching. Where breeding areas are practically non-existent, as in the Bay of Fundy, great betterment of the fishery would result from the regular introduction of small lobsters from other waters. Whether or not such could be economically accomplished, we are not in a position to affirm, and we recommend experimental work of this nature.

A brief reference to the history of size limits may be of interest. Up to 1910 there was a size limit on all parts of the coast; in Charlotte and St. John Counties, N.B., it was 9 inches; in Albert County, N.B., Kings, Annapolis and the Bay of Fundy part of Digby County, N.S., it was $10\frac{1}{2}$ inches. From, and including, St. Mary's Bay eastward to Halifax Harbour, it was 9 inches. From Halifax Harbour eastward and northward to the Labrador, including all the Gulf of St. Lawrence, it was 8 inches. In 1910 the size limit was abolished everywhere in the Maritime Provinces, except in Charlotte and St. John counties, in the Bay of Fundy. It was replaced in 1923 in the western part of Halifax County and in that part of Lunenburg County bordering on St. Margaret's Bay, but to meet special local circumstances the limit was applied to fishing in the month of December only. The Shell Fish Commission of 1912-13 recommended a progressive annual size limit of from 8, $8\frac{1}{2}$, to 9 inches from Digby to Halifax, and one of from 7, $7\frac{1}{2}$, to 8 inches from Halifax eastward and northward to Miscou Island in the Gulf of St. Lawrence. This recommendation was not adopted, because, it was alleged, it would result in closing the canneries; it was also said that the size limit previous to 1910 was ignored and could not be enforced by the poorly paid, part-time Fishery Overseers of that day.

It was suggested to us that as large lobsters should be conserved for spawning purposes, a maximum size limit of thirteen inches should be fixed as well as a minimum size limit. There is a conflict of opinion on this point. It was stated to us in scientific evidence that if the very large lobsters are removed the small ones have a better chance of surviving as more food will then be available for them, and that as the large lobsters to some extent eat the smaller ones the latter will have fewer enemies and will increase in number. As the smaller lobsters make better use of food for growth than the larger ones, the same district will produce a much greater weight of smaller lobsters than of larger ones. Regulations must, therefore, be designed with the purpose of getting the proper balance between large and small lobsters so that there may be a maximum production of pounds without interfering with breeding, and this will naturally vary in different districts.

In making the above recommendations with reference to conservation, we are far from saying that violations of the existing laws are universal or even widespread. It was gratifying to hear that in many quarters regulations are strictly obeyed and that the fishermen are honestly and earnestly doing all in their power for the protection of their own industry. In many places illegal fishing is unknown; "berried" lobsters are zealously returned to the water, and under-sized lobsters are not taken. These facts were made plain to us. But we cannot too strongly emphasize our conviction that great injury has been done and is being done to the industry by lawless individuals and even by whole communities of lawless fishermen. Many canners, too, and dealers must share the responsibility for the present unsatisfactory situation. The fisherman cannot do business without a buyer and we cannot absolve the canner and the dealer from blame for their indifference, or for their purchasing illegally caught fish. We were told by Overseers that in their efforts to enforce the law they received little or no support from the packers in some localities. We are of the opinion that a packer found guilty in a season of trafficking in illegally caught lobsters, berried lobsters, or under-sized lobsters, should after the first deliberate offence automatically have his license suspended for the remainder of that season. If

he is found guilty of buying or taking lobsters after the legal season has closed, he should not be given a license to operate in the next following season. The Department is in possession of the evidence bearing on the chief centres of violations, and these centres should be rigorously watched. Only one conclusion can be reached,—that if earnest and immediate efforts are not taken to protect the industry in these parts it will undoubtedly in a very few years be no longer a profitable enterprise. Either adequate laws must be enacted, and obeyed by fishermen, canners and dealers, or the industry must very soon inevitably disappear. There is no other alternative. If it is to be saved for the future, the fishermen themselves must be its protectors; its life is entirely in their hands, and they must take the full responsibility for its death.

3. *Lobster Pounds.* Lobster pounds were established and permitted in order to benefit the live lobster industry and to regulate the output to suit market conditions. It happens not infrequently that lobsters spawn while still impounded, and it is alleged that such berried lobsters are sold illegally. We recommend that a stricter supervision of all pounds be exercised by the Department, especially on the liberating of berried lobsters, and that the Overseers, or preferably where possible, a member of the staff of the Atlantic Experimental Station, be requested to watch the temperature and the salinity of the water in the pound throughout the winter, and check the condition of impounded lobsters in every way possible. The existing regulations of the Department with regard to checking, etc., seem to us to be fully adequate.

4. *Canneries.*—The number of canneries in the Maritime Provinces is far in excess of the requirements of the industry. Many of the establishments are well equipped and are adequately and excellently conducted, with every possible attention to cleanliness and sanitation. Indeed, evidence of expert inspectors showed that several factories reached in this respect a standard of 100 per cent. But while this fact is gratifying, it must be stated that many of the smaller packing places are very inadequate. The amalgamation of some of these smaller plants would result in great benefit to the industry. The industry's worst enemy has been within itself, in the form of poor products. We were told of complaints from foreign buyers because of discoloured meat and careless packing, which resulted in a lost market. The only remedies for these unfortunate conditions are thorough inspection and more careful manufacture based on efficient labour and adequate equipment. On the discolouration of lobster meat, the following extracts from the evidence of Dr. F. C. Harrison of McGill University, who has given much time and labour to the study of the causes, are of interest:—

“Seventy-five per cent of the discolouration is due to chemical causes and 25 per cent to bacteriological causes—that is to say, to certain organisms getting into the can either through the water or through the lobster and growing in this can and producing black discolouration—but the major part, 75 per cent is due to chemical causes. Lobster when it is packed has practically an alkaline reaction, which is different from other canned products—the only other canned product which has a definite alkaline reaction is hominy, which, however, is not canned in this country. Hominny is canned in the South and they have had a similar blackening owing to the chemical nature of the tins. You are all familiar with the blackening of the spoon put in egg. This is exactly similar to the blackening of the lobster. The lobster contains 3 per cent of sulphur and an egg more, and that alkaline reaction produces black salt—in the case of the lobster an iron sulphide and a small quantity of tin sulphide. In the case of the egg it is a silver sulphide formed from the silver and the egg in the spoon. That develops very quickly in the can and we proved it beyond doubt. We put shingle nails in the can; if it was an alkaline reaction it would act very quickly. In a week the contents blackened if shingle nails were put in a can of lobster.

The thing was what to do in order to change this alkaline reaction. Two substances suggested themselves—one vinegar and the other citric acid. Everyone uses vinegar. Citric acid is the same as you get in grape fruit and in orange, and putting a small quantity in the pickle, that is to say the brine, whether from salt water or fresh water plus salt, would

change the alkaline reaction. By adding a certain amount of vinegar or acetic acid, or spirit of vinegar, to the pickle and using more than they do—they usually show one measure, we suggested a measure and a half—and by using this there was never any blackening, provided the organisms present were destroyed. That was the remedy for the chemical causes.

The remedy for the bacteriological causes was proper processing or sterilizing. The whole method of processing, or boiling, lobsters in the Maritime Provinces is entirely wrong, and it is the only trade I know of where they attempt sterilization by boiling and not by boiling under pressure, that is having the temperature up to 245°. That is the only food I know of in which sterilization is attempted by ordinary boiling. True they boiled it for two or three hours, but you find some forms of bacteria that can stand four, five or six hours boiling at a temperature of 212°. Retorts, that is steam under pressure, should be the only method of sterilizing the cans in lobster canneries. We canned the lobsters and kept them for two years. I went down to the Maritime Provinces and took some of these cans with me and opened them and showed there were no traces of blackening. They would not believe that this was possible—to keep them for this length of time until I showed them. Of course a little red appeared but this did not amount to anything."

There seems, however, to be some difference of opinion on the necessity for retorts. We recommend that from all the scientific evidence available, the Department consider the feasibility of requiring canners to equip their factories with retorts for boiling under pressure. These are obtainable at a very small cost. We recommend, too, that the suggested regulations of Dr. A. P. Knight, known as the Knight Regulations, be applied as closely as possible. Where the full enforcement of these regulations would result in undue hardships or great loss, we recommend that the Department apply them at first in modified form to suit individual cases, and that a reasonable time be given for their full and final adoption. It must be remembered that with the intense competition of foreign products, particularly Japanese crab meat, canneries must have the efficiency and the essentials of a laboratory. The day of slovenly, poorly equipped factories has gone; the modern market will no longer tolerate products manufactured under such conditions.

5. *Markets.*—The market is gradually changing from a canned lobster market to a live lobster market, but the former is still much greater than the latter. Of the catch last year of about 31 million pounds only about 8½ million pounds were disposed of in the shell, while 23 million pounds were used for canning. As the market price for live lobsters averaged to fishermen at least three times that of lobsters for canning, the live lobster industry was nevertheless the more valuable. The canned lobster market in Europe has decreased in late years because of depleted currency, heavy customs duties, poor quality of the pack, and the competition of Japanese crab meat. But while the foreign market has declined, we were surprised to find that so little had been done by the canners to extend the home market. We believe that a greater demand for canned lobsters can be created in Canada and that the consumption can be considerably increased. To explore this market we were asked to recommend Government assistance in advertising, but we do not feel that such assistance would now be justified, particularly to an established industry of such long standing. The packers of Japanese crab meat each contribute a stated sum per case for advertising their product and for seeking new markets.

We found an unfortunate lack of co-operation among the canners and dealers, both in standardizing the quality of the product and in marketing. It is obvious that greater success could be attained if co-operative methods in selling were followed and if by co-operation the reputation of the Maritime Provinces product in quality, weight and general attractiveness to the consumer were jealously safe-guarded by the canners themselves. But up to the present there has been a somewhat surprising indifference to this necessity.

6. *Inspection.*—We found a widespread feeling in favour of inspection of canneries and of the canned product, and we recommend that a method of inspection be devised by the Department and strictly applied. Not only should can-

neries be subject to inspection by fishery officers, but the pack should be inspected at the point of export. Many representations were made to us with reference to Japanese crab meat and to the effect of its competition, and we were asked to recommend that it be subject to a high customs duty of 25 per cent. But this foreign product competes with the Maritime Provinces lobster in the European market rather than in Canada, and a duty on Japanese crab meat entering Canada would have but little effect on the lobster industry. We believe that as a delicacy in itself, the lobster has little to fear from the Japanese crab, but in the quality of the pack, in inspection and in the method of marketing, it must be improved if it is to survive the competition. If the Maritime Provinces lobsters are properly manufactured and inspected, and if only the best grades are exported, they will not be superseded by foreign crab meat. But a drastic change must be made in this phase of the industry. The methods of the Japanese packers as outlined in the following paragraphs by Mr. Langley, Canadian Trade Commissioner in Japan, may be of interest:—

Inspection and Grading.—When canned crab began to be recognized as an important export product, many concerns with very little experience went into the canning business and sold crab of poor quality. As a consequence many complaints were received from foreign buyers regarding the bad quality of the canned crab exported, and after repeated requests for improvement of the canning process had been received by the authorities during 1908 and 1909, the Ministry of Agriculture and Commerce called a meeting of the concerns interested in the putting up of canned crab, and enlisted their assistance and recommended a strict inspection of all crab intended for export, this inspection to be carried on not only by the authorities at the producing plants, but also by the organizations concerned at points of export. As a result of this co-operation, canned crab is now inspected at the packing plant and also at the port of exportation. In the Hokkaido district this inspection is carried on by the Kemuro-Chishima Marine Products Canners' Association and in Saghalien by local Government authorities. Prior to shipment, inspection is again made at Tokyo, Yokohama, Kobe, Osaka, and other export centres. In Yokohama the Association of Provision Exporters began inspection as early as 1912. In 1915 the Government again emphasized the necessity of stricter inspection and grading, and at that time allocated certain sums to ensure enforcement of the regulations. After the Federation of Crab Packers and Exporters Association of Japan (generally known as the Japanese Canned Crab Packers and Exporters Association) was formed a few years ago, authority to supervise the inspection was transferred to this federation. The inspection is in accordance with the regulations issued by the Ministry of Agriculture and Commerce.

According to the regulations: (1) 10 per cent of shipment is to be examined in reference to packing, swollen and rusted cans. (2) For quality inspection not more than five cans from one shipment; less than fifty cases of the same grade, or not more than ten cans from each shipment of fifty to one hundred cases, not more than twenty cans from each shipment of one hundred to five hundred cases. (This ratio applies to larger shipments) (3) After examination cans are to be classified in three grades—"Fancy", "Choice", "Fair". (4) Crab meat classified as "Flakes", the fourth grade, will be reclassified into two classes, "A" and "B", (5) In addition to examination as to quality and condition, weight is to be inspected. (6) A stamp, denoting the grade, is placed on each case and a certificate is given for each lot of shipment.

The following figures show the results of examination at Yokohama, Osaka, Kobe, and Hakodate made during the three years ending December, 1925:—

Classification	1923	1924	1925
	Doz.	Doz.	Doz.
"Fancy".....	107,466	155,210	200,908
"Choice".....	18,395	26,728	57,222
"Fair".....	13,819	21,361	18,230
"Flakes"—			
"A".....	10,777	44,163	69,393
"B".....		16,614	37,796
Under Grade.....	6,013	17,958	16,809
Spoilt.....	821	3,585	748
Total.....	157,291	285,620	401,106

The federation of the various crab canners and marine products associations was organized in May, 1924, affiliating, as already mentioned, for the purpose of enforcing regulations regarding inspection of canned crab, for the purpose of helping in the improvement of the canned crab; and for the development of markets by advertising, and also in order to govern the sale prices each season."

From the above paragraphs it is evident that the care in packing, the graded quality, and the rigid inspection are doubtless in large measure responsible for the popularity of this product in the markets of the world.

We recommend that a definite system of branding and labelling be established. At present large dealers frequently buy from small factories unlabelled cans, and ship them to Europe where the European dealer attaches his own label. When later the product is found to be inferior in quality there is no way of tracing the inferior pack back to its packer. We recommend that all packers be required to stamp such unlabelled cans with an identification stamp or mark and that such marks, numbers, or letters, be assigned by the District Overseers.

7. *General.*—We were asked to recommend the establishment of sanctuaries for lobsters in certain waters, or in sheltered coves or bays. The feasibility of such sanctuaries should be investigated further by the Department as there seems to be a conflict of opinion on their value. It was suggested to us that the weight of meat in the cans should be reduced so as to prevent the bulging of the can ends. Such bulging, however, is apparently caused by careless packing. Several suggestions were made to us on the use of by-products. It was pointed out that thirty per cent of the lobster was unnecessarily wasted and that more attention should be given to the canning of lobster paste. On this subject, Bulletin No. X—"The Preparation of Lobster Paste" by R. F. Ross, Assistant for Technical Processes, Atlantic Experimental Station, Halifax, N.S., contains abundant information and is available to fishermen and canners.

It was suggested by the fishermen of Grand Manan that crates or boxes, in which live lobsters are held should bear the name of the owner of the lobsters so kept, and we recommend that a regulation should be enacted to meet this request. We were told in some parts that the number of traps operated by each fisherman should be limited, but we can make no recommendation on this suggestion. We recommend that a design for a standard crate for the shipping of live lobsters, and also a crate for the storing of live lobsters while awaiting shipment, be designed or obtained by the Department; that methods to ensure the reduction of mortality to a minimum during transit be studied; and that this information be made available to fishermen and shippers.

We recommend that any changes in existing regulations bearing on lobster seasons and size limits be not enforced until 1929.

OYSTERS

For many years the oyster fishery was one of the most valuable fishing industries in the Maritime Provinces, but its story is a distressing story of decline, and, in places, almost of extinction. The following table gives in concrete form the annual quantity taken in a period of fifty years, from 1877 to 1926.

Year	New Brunswick	Prince Edward Island	Nova Scotia	Total
	bbls.	bbls.	bbls.	bbls.
1877.....	7,730	20,850	980	29,568
1878.....	11,270	17,922	912	30,090
1879.....	9,420	18,145	1,067	28,632
1880.....	12,280	20,297	1,861	34,438
1881.....	8,413	20,815	2,270	31,498
1882.....	5,859	57,042	1,745	64,646
1883.....	10,317	38,880	1,343	50,540
1884.....	11,851	28,290	1,595	41,736
1885.....	27,368	28,204	1,310	56,882
1886.....	28,083	33,125	1,397	62,605
1887.....	23,196	36,448	1,716	61,360
1888.....	16,384	35,861	1,589	53,834
1889.....	17,760	41,257	2,532	61,549
1890.....	16,710	35,203	3,013	54,926
1891.....	14,934	41,030	4,318	60,282
1892.....	17,840	32,937	3,776	54,553
1893.....	16,365	29,627	3,488	49,480
1894.....	16,960	24,055	2,512	45,527
1895.....	18,070	25,463	2,540	46,073
1896.....	14,700	30,214	2,400	47,374
1897.....	19,835	20,915	2,372	43,122
1898.....	22,675	26,484	2,097	51,256
1899.....	17,250	18,236	2,027	37,513
1900.....	19,240	17,825	1,855	38,920
1901.....	14,460	24,972	1,690	41,122
1902.....	12,719	20,334	1,663	34,716
1903.....	12,479	18,333	1,354	32,157
1904.....	15,320	18,006	1,411	34,737
1905.....	14,300	17,656	1,466	33,422
1906.....	14,920	14,988	1,722	31,630
1907-08.....	15,435	1,672	1,337	26,444
1908-09.....	19,080	11,472	1,515	32,067
1909-10.....	19,340	13,519	1,716	34,575
1910-11.....	14,045	11,264	1,696	27,005
1911-12.....	15,436	8,835	2,090	26,361
1912-13.....	9,239	8,631	2,726	20,596
1913-14.....	10,800	12,951	3,397	27,148
1914-15.....	15,130	7,823	1,824	24,777
1915-16.....	12,498	6,206	1,592	20,296
1916-17.....	8,294	6,431	2,074	16,799
1917.....	6,926	3,038	1,879	11,843
1918.....	7,188	3,375	1,904	12,467
1919.....	7,343	3,392	1,451	12,186
1920.....	8,207	2,775	1,826	12,808
1921.....	11,094	3,792	2,356	17,242
1922.....	10,708	5,211	1,464	17,383
1923.....	14,574	4,035	2,765	21,374
1924.....	17,201	7,945	2,173	27,319
1925.....	12,038	5,278	2,644	19,960
1926.....	12,383	5,161	2,354	19,898

Production reached its highest point in 1882 with nearly sixty-five thousand barrels; in 1926 it was less than twenty thousand barrels.

During the first forty years of that fifty year period, the average yearly production was about forty thousand barrels. During the past ten years the average decreased to eighteen thousand barrels. The greatest decrease was in Prince Edward Island; there, the peak of production was reached in 1882 with a total quantity of fifty-seven thousand barrels; in 1926 the quantity taken amounted to slightly over five thousand barrels. The decrease in Nova Scotia and New Brunswick has not been relatively so great, but the diminution has been equally serious.

Many reasons were given to us in attempted explanation of the astonishing decline, but the evidence has not been definite and conclusive in support of any one of them to the exclusion of all others. There is a conflict of opinion on the causes for the marked diminution. Among the reasons given to us was the

method of fishing, with tongs or rakes, which bring up large quantities of sea-bottom consisting of mud and eel grass; this is dropped back into the water and, it is alleged, covers and destroys the young oysters. Other reasons advanced were the inroads of the starfish, the enemy of the oyster; the accumulation of silt; the destruction of beds by the taking of sea-bottom for farm fertilizer; the almost total lack of proper cultivation of beds; and the spreading of disease brought in by oysters from other parts for the purpose of planting or replenishing areas. In Malpeque Bay, Prince Edward Island, once the most noted oyster producing region in the Maritime Provinces, the disappearance of the oyster was coincident with the planting of some of the beds with oysters from other waters, but whether or not these imported oysters carried disease which brought about the death of the native fish has not been clearly established.

The gradual disappearance of the oyster in many parts may be due to a variety or a combination of causes. But it is plain that in the Maritime Provinces, with the exception of very few places, there has never been intelligent cultivation of oyster areas. The beds have been left almost wholly to natural courses and development, and little artificial cultivation has been attempted. Sea-bottoms where the oyster thrives, have, invariably, abundant material to which the seed can cling. On bottoms where no such materials exist in sufficient quantity but which otherwise are favourable for growth, successful producers of oysters place oyster shells, birch branches and other deposits to which the seed can attach itself. The problem is solved by thorough cultivation, which implies keeping the beds clean, placing on them the proper deposits, replenishing them with seed, and persistent care. We feel that a sufficient study has not been made of the necessary requirements for profitable production, or of the causes responsible for the present unfortunate condition of the industry. Until that is done, only general recommendations can be of value. Several years ago considerable scientific research was carried on in the Maritime Provinces in relation to the oyster. But it was apparently for purely scientific or biological purposes and had only remote bearing on the commercial aspect of the industry. At any rate, whatever knowledge it may have acquired, its results have not been evident in great practical value in the areas where it was conducted. We believe that the present is an opportune time for making new researches and experiments. We recommend, therefore, that a survey of the Maritime Provinces waters be undertaken at once to ascertain, if possible, the causes of depletion in certain areas, to devise means for re-establishing these areas and to create new areas, to determine upon the best means of cultivation and to formulate plans for the instruction of fishermen or dealers in these methods.

This work should be undertaken by the Department, through the Atlantic Experimental Station. To carry it on effectively, it will be necessary to establish experimental oyster beds or "farms" or demonstration areas. Such places would not only serve as models of care and cultivation, but they would be sources of knowledge to all interested in the industry. They would also serve as places for the production of "certified seed", which would be available to oyster farmers desiring to stock or to replenish their beds. They should be in charge of competently trained supervisors with practical skill and experience and some scientific knowledge. In the United States, for example, the Government operates what are called State beds, which are maintained for the benefit of all lease holders within reasonable radius. They afford practical demonstrations of improved methods of cultivation and they provide certified seed or spawn for those requiring it. Efforts in general should be made to determine where the oyster produces the most spat, and arrangements should be made for the transfer of young oysters to places where the best quality of oysters can be grown. For this purpose the laws governing the shipments of certified oysters from one

province to another might, under certain circumstances, be made more elastic. We recommend that special attention be given to Malpeque Bay in Prince Edward Island in order to determine whether or not the restoration of the once valuable oyster fishery there carried on is now possible and under what conditions it can be revived. And in order to assist the Atlantic Experimental Station to carry on its work with greater efficiency, convenience and despatch, we recommend that the Department provide at Malpeque Bay or Richmond Bay, or at a place to be selected by the Director of the Station, a small experimental station with the necessary equipment, for the further study of the problem by the staff of the parent Station.

Considerable difficulty has arisen because of conflict on the question of proprietorship of oyster areas by the Provincial Governments or the Dominion Government. While the Province owns the areas, the Dominion Government is considered, and held, responsible for their regulation. The result of this situation is not satisfactory, and a new relationship between the two authorities should be established. Prince Edward Island has recently relinquished its right of proprietorship and has given over its oyster areas to the full control of the Department, which will henceforth supervise and lease them. We were told on behalf of the Government of New Brunswick that if such an arrangement was considered advantageous by those interested in the industry no obstacle would be placed in the way of its fulfilment by the Provincial authorities, and that whatever action would be regarded as the better for the industry would ultimately be taken, if such private interests as now exist will be cared for. In Nova Scotia, it was stated on behalf of the Provincial Government that the areas would not be given over to the Department, but that certain places, if required, would be given to the Department for purposes of experimentation or demonstration. We feel that a uniform policy should be followed, and that the arrangement entered into between Prince Edward Island and the Department would, if adopted by all the Maritime Provinces, be in the best interests of the industry. One of the obstructions to development in the past has been the lack of definite control and responsibility.

We believe that the majority of oyster areas should be leased to private individuals or companies at a fair rental, with the understanding that a certain amount of work must be done on the beds each year under the supervision of an instructor appointed by the Department for the purpose. Provision should be made for public fishing in areas reserved for the public, under strict regulation and supervision. But the establishment of privately leased beds would solve many of the problems and would result in conserving and developing the industry to a highly remunerative level.

The areas leased and privately operated by Mr. William Mombourquette at Orangedale, N.S., and by Mr. Edward B. Barnes at Buctouche Harbour, N.B., are striking examples of the success that can be attained by the leasing of private areas, by proper cultivation, by the application of scientific methods in protecting the spawn, and by the general care of the beds. The former area consists of 102 acres practically all under cultivation but not all fished each season. Every year a certain section of the area is cleaned and carefully cultivated. Successful experiments have been made in transplanting beds with small oysters from other places. The production here was, last year, about 500 barrels, which, with further development, will greatly increase. The latter area, in Buctouche Harbour, consists of $12\frac{3}{4}$ acres, all under cultivation. Here too, successful experiments have been made in transplanting beds with small oysters or spawn taken from Richibucto. The production of this area was last year 564 barrels. Both of these efficiently conducted areas produce oysters of excellent quality and of the highest reputation; they are in demand not only in the markets of Canada and the United States, but also in those of England and France.

There is no doubt of the great demand for oysters in the shell and in bulk in the Canadian and the United States markets. The demand for good oysters is in excess of the supply, and with the requisite care in production and in marketing, the industry could be made exceptionally profitable. The industry has been injured in the past, however, by the thoughtless or deliberate carelessness of shippers. The quantity of oysters forwarded in a barrel has varied, even the size of the barrel has not been uniform, and the container has been of many forms. There has been no adequate grading, and large quantities of very small oysters are taken contrary to the regulations, with disastrous results to the beds. We recommend that the size limits be strictly enforced, not only among fishermen and dealers, but in retail places where oysters are sold; it should be unlawful to sell, or to expose for sale, undersized oysters. We recommend that shippers be required to ship oysters in a standard barrel, and that the standard quantity in each barrel be fixed by regulation; the quantity suggested to us was two and a half or three bushels. We recommend too, that all barrels be branded with the name and address of the shipper, the kind or grade of oysters contained therein, and the name of the locality in which they were grown. The Malpeque oyster has temporarily disappeared and is not now a commercial product. Yet, oysters sold in the Canadian markets are still advertised as "Malpeque oysters." The use of misleading trade names should be prohibited. Oysters should be inspected at the point of shipment, and the shipment, whether of oysters in bulk or in the shell, should be accompanied by a certificate showing that they were taken from unpolluted waters. In France, for example, all shipments of oysters must have such certificates. Similar certificates are now required from oyster shipments imported into Canada, but in the interests of the industry they should also be required with shipments from the Maritime Provinces.

It was suggested to us that considerable waste arises because of the throwing away of the oyster shells. The shells, we were told, are ground elsewhere into "grit" to be mixed with poultry feed. We were informed that there is a growing demand in Canada for this product, which is now imported from the United States in considerable quantities. Shells are also of value in oyster cultivation by providing places of attachment for the spawn. It was suggested that the waste of shells could be eliminated by shipping oysters in bulk rather than in the shell. But the form of shipment must conform to the requirements of the market. And in the supplying of the market, in any form, the replenished and reserved oyster areas of the Maritime Provinces, under proper cultivation and supervision, would seem to have almost unlimited capacity.

3. SCALLOPS.

The scallop fisheries of the Atlantic Coast are already quite substantial, and are undoubtedly capable of very great development. Statistics indicate a total catch in Canada in 1926 of 23,200 barrels valued at \$147,228. Of this quantity Nova Scotia produced 19,918 barrels; New Brunswick 560 barrels; Quebec, 2,722 barrels. Of the production in Nova Scotia, 5,000 barrels were taken in Lunenburg County, about 8,300 barrels in Digby County, and about 6,600 barrels in Annapolis County. These three counties, therefore, produced a large proportion of the total catch on the Atlantic coast. In New Brunswick the production in Charlotte and Restigouche Counties was, respectively, 245 and 315 barrels; while in the Province of Quebec, Bonaventure County produced 722 barrels, and Gaspé County 1,950 barrels. In 1927 the total production in Canada was 39,090 barrels, of which 37,595 barrels came from Nova Scotia. The most extensively organized scallop fishery is conducted in the Bay of Fundy, chiefly

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from the port of Digby, N.S., where 35 to 40 specially equipped boats operate, each costing on the average about \$2,500. This scallop fleet began operations about six years ago.

It is apparent that scallops are to be found in abundance around the coast of the Maritime Provinces, the Gaspé Peninsula, and the Magdalen Islands. In many places outside of the well known and recognized scalloped areas, large quantities of scallops have been taken. We have been permitted to see the report of an exploratory survey of scallop beds made by the Department in 1924 along the northern shores of New Brunswick. From that report it is evident that scallops are there to be found in substantial quantities.

It was urged that the Department be requested to make exploratory surveys of scallop beds along the entire coast of the Maritime Provinces. There is strong evidence that scallops are to be found off the Prince Edward Island coast, but the extent of the beds has not yet been determined, and this is equally true of other parts of the Maritime Provinces and Quebec. We strongly recommend that these exploratory surveys be commenced as early as possible.

Scallop fishermen from the vicinity of Chester, N.S., where the scallop fisheries have been carried on for many years, requested us to recommend a closed season of three years in Lunenburg County for the purpose of conservation. Suggestions were also made to us elsewhere that the present closed scallop fishing season be changed. Because of the meagre facts submitted to us, we cannot make any recommendation. Sufficient study has not yet been made of the scallop, and we recommend that these requests be promptly taken into consideration for study and investigation by the Department through the Atlantic Experimental Station at Halifax. There are many other questions regarding the scallop fisheries which require close observation and study with a view to assisting those interested in this fishery. The possibilities of this very promising industry have not yet been sufficiently explored. The scallop population of the known fishing areas should be studied carefully and periodically, so as to discover in time when restrictive measures should be adopted for the preservation of the scallop beds. Intensive fishing of present prolific areas will undoubtedly cause a rapid decline in the catch, and therefore we think the intensity of the fishing should soon be wisely regulated. There is no limit at present in Canada to the catch of scallops per person, per day. In the United States it has been found necessary to set a definite limit; in the State of Massachusetts, the catch is limited to 10 bushels per person per day, including the shells; in Rhode Island the limit is 15 bushels per boat per day. We suggest a study of the propriety for a similar limitation of the scallop catch in the Maritime Provinces.

While we think the Canadian market for fresh scallops is capable of great expansion under proper selling organization, the canning of scallops in a form attractive to consumers would minimize the danger of over-production in the fresh form. We recommend that investigation be conducted on the most improved methods of canning scallops, on the possibility of enlarging the market, and on improved methods of marketing.

4. SALMON

In order to present in convenient form the extent and value of the salmon fishery in the Maritime Provinces and Quebec, we include as appendices V and VI statistics of the catch in quantity and value by provinces for the last ten years; the number of boats and fathoms of nets used in salmon net-drifts in the Miramichi Bay from 1907, when this method was there first used, down to the year 1927; also the yield for the years 1922 to 1927; and the number of net stands in Miramichi Bay and River, with the production for the years 1922 to 1927 inclusive.

The salmon fishery in New Brunswick presents problems which are not found elsewhere, at least not to the same extent. To make these problems intelligible it is necessary to refer briefly to the habits of the Atlantic salmon. From

the early summer months onwards the salmon ascend the rivers to spawn, the time of migration depending much on the character of the streams. The young salmon is said to remain in fresh water until it is one or two years old; in its second or third year it goes out to the sea where it reaches its growth; it then returns to its natal stream to spawn. The best authorities believe that when the salmon leaves a river it does not journey far but dwells in the sea near to its natal waters. In the small streams of New Brunswick, a large part of the salmon run is in the late summer. The Departmental view, supported by Dr. A. G. Huntsman, Director of the Atlantic Biological and Experimental Stations, is that many of the smaller streams have not now, during the early summer months, the volume of water or the low temperatures that prevailed before the clearing of the forest lands through which these streams flow, and that the fish, therefore, remain outside until the conditions for ascending the streams are more favourable.

Salmon fishing in river estuaries is chiefly carried on by means of stake-nets, and in the bays and along the coast by anchored nets. In Miramichi Bay in recent years the drift-net has been extensively used. By this method, a boat having a long net, or several nets joined together, extended like a vast curtain, drifts with the tide, the length of the nets being on the average 750 fathoms. The number of boats engaged in this particular form of fishing has grown from 4 in 1907 to 61 in 1927, while for the same period the total fathoms of net used has risen from 2,400 to about 40,000. Drift-net fishing in the Miramichi Bay is prohibited within a line drawn from the light house at Escuminac Point to the eastern side of Tabusintac Gully. In the seasons of 1925 and 1926 it was found that salmon were not as plentiful as formerly in the upper waters of the Miramichi River. With the hope of promoting a more pronounced movement of salmon to the headwaters of this river, and generally for their conservation and propagation, the regulations were amended in November 1927 so as to end net fishing for salmon in the river on August 15th instead of the 31st, and drift-net fishing in the Miramichi Bay on July 31st instead of August 31st.

Apart from the net-drifters, there are three classes interested in the salmon fisheries of the Miramichi River and Bay. These are, first, the set-net fishermen who operate from the mouth of the river to the head of tidal waters; in 1927 they numbered two hundred and eighty-six; second, the set-net fishermen who operate above tidal waters; these numbered last year, twenty; and third, the anglers, who are licensed by the Government of New Brunswick, and the riparian owners with fishing rights, leased from the Provincial Government. These three classes of fishermen contend that during the past few years the spring run of salmon has become almost negligible because of the net-drifting conducted in the Miramichi Bay and in the Gulf of St. Lawrence. They declare that there is a menacing volume of drift-net fishing in the season when salmon are running in the river between the last week of May and the tenth of June, and they ask that drift-net fishing be not permitted to such an extent as to deprive the angler and the set-net fisherman of a reasonable catch. They also stated that the regulations governing the size of the mesh are not sufficiently enforced, nor are the limits prescribed for their operation strictly adhered to. It is also complained that the official statistics do not accurately disclose the actual yearly catch of the drifters. A representative of certain riparian owners and anglers stated to us, that the total catch of salmon in the Miramichi district was officially reported as 676,800 lbs. in 1926, while for the same year and district, the Canadian National Railways alone carried 1,330,554 lbs. by freight and express, and that to this should be added local and inland sales which would bring the total catch well up to 1,500,000 lbs. It was suggested that this quantity was largely taken by the drifters, and that the quantity taken by set-net fishermen, riparian owners and anglers was negligible. It is by such statistics that many salmon fishermen supported their case for the limitation

of net-drifting which they contend, if not carefully restricted, will ultimately destroy the Miramichi salmon fisheries.

Various recommendations were made to us by the protesting classes. Among these were: (a) the entire prohibition of the drift-net; (b) the reduction of set-net licenses in order to allow a fair proportion of salmon to move up the river; (c) the prohibition of drift-nets for one year in order to observe the results of the cessation of that form of fishing; (d) the prohibition of drift-nets until the first day of July, thus permitting more salmon to move up the river in the spring; (e) the permitting of net-drifting only in alternate weeks; and (f) the reduction of the number of fishing days per week.

Those engaged in the net-drifting fishery say that it is not always profitable; that they have on the average only four nights a week of fishing because of stormy weather which frequently prevents their operations; that net-drifting has not diminished the up-river catches, but that the decline in the catch in the river proper, is caused by the fact that the set-net fishermen are allowed to have too many nets and too many fishing days per week.

From evidence in our possession we do not feel that we can rely upon the official statistics of the quantity of salmon caught by the drifters and others. At least they are so doubtful that we are not warranted in reaching conclusions based upon them. The statistics given to us based upon railway shipping records may be equally unreliable, for it must be remembered that the Canadian National Railways distinguishes its freight and express shipments of fish only as fresh and frozen fish, and makes no distinction in the various kinds of fish transported.

While the statistics of the catches of salmon given in appendix V, cannot be considered as wholly correct, there is no reason for believing that the method of collecting them has altered, and the figures should therefore show with comparative accuracy the increase and decline in the fishery. From 1922 to 1926 the number of drift-nets and set-nets in the Miramichi region was practically constant. Within this period the total catch almost doubled from 1922 to 1924, but by 1926 it dropped to somewhat less than that of 1922. The rise and the fall equally affected these two classes of fishing, which practically divided the catch between them. They must, on that basis, be considered as equally responsible for taking fish that might have gone up the river to the anglers, but there is a probability that the fish caught by the set-nets and therefore already in the lower reaches of the river, were on their way up-stream and belonged to the so-called "spring-run".

The reason for the pronounced rise and equally rapid fall during the period under consideration is far from clear. It was not however confined to the Miramichi region. It did not occur in the St. John region of southern New Brunswick, but a similar variation is shown in the catches along the northern coast of the Province, in Kent, Gloucester and Restigouche counties. The latter two counties, which are north of the Miramichi, show an equal or even more rapid rise, but a much smaller decline.

The regulations now require that drift-nets must not be used from sunset on Saturday until six o'clock on Monday morning. But as drifting operations are carried on only at night, the net-drifters are thus allowed but five nights of fishing each week, and the movements of salmon are not therefore impeded by net-drifters from Saturday morning to Monday after sunset. In addition to this regulation, stormy weather prevents the net-drifter from fishing one night a week on the average, so that his actual fishing time averages four nights a week from sunset to sunrise, or approximately thirty-five to forty hours out of one hundred and sixty-eight hours a week. It would seem to us that in the total closed period the salmon has ample freedom to enter the river, for the migration cannot always coincide precisely with the periods of net-drifting. We cannot, therefore, recom-

mend any change in the time permitted for such a mode of fishing. We believe, however, that there has not yet been a sufficiently careful and proper study made of all the facts pertaining to the question in controversy, and we recommend that further investigations be made by the Department. Meanwhile, we recommend as remedial measures, that no further extension of the present total length of nets used be permitted, and if additional licenses are issued the length of nets used by each fisherman must be shortened accordingly; that the mesh of set-nets in the river be fixed at six inches for the season of 1929 and thereafter; that no further set-net licenses be granted in the Miramichi River, and if possible that they be reduced; and that there be a more vigilant and vigorous enforcement of the regulations in the tidal and non-tidal parts of the river.

The salmon fisheries of the Restigouche River and Bay de Chaleur appear to be well maintained. The headwaters of the Restigouche are held by riparian owners, and the fishing rights are leased from the Government of New Brunswick, which last year received \$75,500 therefor, this sum to be paid annually for ten years. For the ten years previous to 1927, the annual amount paid was \$16,000.

It is a stipulation of the leases that the lessees shall provide guardians or officers to protect the head waters from illegal fishing, and to enforce all the regulations. The Riparian Association, comprised of such lessees, spend annually for the protection of the salmon in the Restigouche and its tributaries over \$30,000. Fishermen and others interested in this district testified to the beneficial results of the efforts of the Riparian Association in carrying out their agreement to protect the salmon fishery. Such testimony was of interest because it indicated that the enforcement of the regulations designed to conserve the salmon is productive of visible results, and that there is approval, rather than criticism and suspicion, of private lessees.

Numerous strong representations were made to us by residents along the Restigouche River and on the south side of the Bay de Chaleur, respecting the practical value of the fishery regulation, section 17 (8), which requires the raising or manipulation of salmon nets so as to admit of the free passage of salmon from a certain hour on Saturday to a certain hour on Monday morning. Compliance with this regulation was said to entail unnecessary hardships and difficulties, and it was stated that it was not productive of any valuable result. Below Dalhousie, where the Bay is more than twenty-five miles wide, it is clear that the regulation is not well observed, and it is doubtless true that at times it is difficult, or almost impossible, to comply with it because of stormy weather; on the north side of Bay de Chaleur the regulation seems to be fairly well observed.

We were told, on the other hand, that in making its way up to the river, the salmon follows the shore line, and it is to ensure an unimpeded approach for a limited period that nets are required to be raised weekly. The governments of the Provinces of Quebec and New Brunswick have protested against any change in this regulation. We cannot recommend its repeal so far as it relates to the district under discussion. But we suggest that fishery officers exercise a wise discretion in enforcing the regulation when its observance is rendered difficult by weather conditions. We think, however, that the question of net raising should soon be definitely settled, so that requests for the repeal of this regulation will not continue to be made year after year. We recommend that the Department call a conference of representatives of the Governments of Quebec and New Brunswick, and of the fishermen, together with its own departmental officers, for a frank and exhaustive discussion of the subject. We have dealt with this point at some length, because of the extensive coast-line to which this regulation is applicable, the number of persons affected by it, and the extent of this fishery in the Bay de Chaleur.

A similar regulation requiring the lifting of nets on Saturday evening is in force in Nova Scotia, and we were asked on behalf of the salmon net fishermen that it be repealed. We were also asked to recommend that a regulation be enacted requiring salmon nets to be set at a greater distance from the mouth of the Margaree River than at present. The evidence on each of these points is not conclusive, and we think further investigation should be made by the officers of the Department. If they find evidence that nets are set so close to the mouth of this river as to prevent a reasonable up-stream movement of salmon, new limits should be fixed. The setting of nets in the mouth of any river, should not be permitted and the Department should courageously support its officers in the enforcement of the regulations bearing on this offence.

Our attention was called to the fact that on the River Medway, N.S., thirteen salmon nets are annually licensed, although contrary to the general practice on such river. This discrimination is permitted on the theory that as this right was at one time granted to certain riparian owners, it should not in equity be taken from them in their life time. Under an old convention the privilege lapses upon the demise of the holder of each existing license. No licenses are granted to others on this river, whether riparian owners or not, and those to whom licenses are refused are dissatisfied because the privileges denied to them are granted to a limited few. We recommend that this practice be discontinued.

Representations were made to us requesting that in places the salmon fishing season be changed; that the period of fishing be extended or shortened; that only certain kinds of nets be used; that nets be set farther apart; that certain existing regulations be relaxed, and new restrictions enacted; that the number of guardians be increased; that salmon net licenses be limited to one per person; and that the mesh of salmon nets vary in size in different localities. It is not possible for us to give decisions on all these matters. They are questions which can be more intelligently and effectively disposed of by the Department after careful and complete scientific investigation.

5. SHAD.

Shad spawn in the spring in the fresh water of streams emptying into the sea. The young stay for a brief time in fresh water and then drop down into the estuary of the river and finally reach the sea. Here they remain the greater part of their lives, as a rule not far from the mouth of their natal river. In about four years they mature, and ascend the river in the spring to spawn. It is during this spawning period that they are exposed to the greatest danger of depletion, as they congregate in definite localities where they may be very readily taken. If fished at all, they must be taken with nets, and such fishing gear makes possible the greatest abuse in catching whole schools of the fish. During the spawning period they are in the poorest condition, but yield roe for which there is considerable demand.

The growth of the fish takes place almost wholly in the sea, and during this period they are so scattered over a considerable area of open water, that fishing for them with nets may not be profitable, but even here the fishery requires regulations to ensure protection. The sea fishery is conducted during the summer and yields fish in prime condition and most desirable for food.

The shad fisheries are decreasing notwithstanding a three years closed season in 1918, 1919, and 1920. In 1861 the catch was close to three and one-half million pounds. There have been increases and decreases since, but generally the trend has been steadily downward. Since the closed season referred to, there was an increase for three years, but the catch for 1927 was 2,685 cwt. as compared with 5,152 cwt. in 1926. The shad is caught in rivers, chiefly the St. John, Petitcodiac, Shubenacadie, Annapolis, the Miramichi and the St. Lawrence. A closed season was suggested for the Shubenacadie river and other rivers in Nova Scotia for a period of five years and also in the estuaries of such rivers.

It was also suggested that fishing be limited to the open sea. The information available to the Commission is not very conclusive, and scientific investigations have not yet been sufficiently extensive to warrant us in making any important recommendations. This subject has had the attention of Dr. A. H. Leim of the Atlantic Experimental Station but his work has not yet been completed. We recommend that he be enabled to continue it as vigorously as possible. The results of his work will doubtless provide data on which regulations for the conservation of this very valuable fishery may be based. The whole subject is one which requires careful and intelligent study, largely of a scientific nature.

Meanwhile the only recommendation which we venture to make to the Department for its serious consideration, is, that certain areas in rivers peculiarly adapted for the spawning of shad, should be set aside as sanctuaries and that net fishing in such waters be at all times prohibited. Pending the completion of Dr. Leim's investigations we cannot recommend a closed season for shad fishing in any of the rivers in the Maritime Provinces, except those which may be reserved as sanctuaries. To bring the fishery back to its former level however, we emphasize the necessity for entirely preventing fishing during the spawning season. This may involve a more continuous patrol of the most important streams during such a period.

6. SMELTS.

The Maritime Provinces possess some particularly successful but very localized fisheries. These are dependent upon the existence in restricted localities of extremely favourable conditions for the fish in question. The smelt has a wide distribution on both sides of the Atlantic, and is to be found on the North American side from New Jersey to the Strait of Belle Isle. On the Canadian coast, with the exception of the north shore of the Gulf of St. Lawrence, it is fished to a greater or less extent everywhere. Northumberland County in northern New Brunswick, with a frontage on the Gulf of St. Lawrence of only about twenty-five miles, furnishes from two to three and one-half million pounds annually, which is approximately from one-quarter to over one-third of the total catch of smelts in Canada; about one-seventieth of the coast yields, therefore, about one-third of the catch.

When it is realized that Canadian waters yield about three-quarters of the world's production of smelts, it will be seen how important are the waters of Northumberland County, in providing the foremost smelt fishery of the world. The coast of this County coincides with the sea front of the Miramichi River System, which drains the central part of the province of New Brunswick. This river is tidal for a distance of over thirty miles from the sea; it is only about three fathoms deep, and the tide has a range of only three or four feet. Not only are the main river and its two principal branches broad and shallow for many miles, but near its mouth it broadens rapidly into a shallow inner bay comprising about seventy-five square miles, which is protected from the open waters by a series of sandy islands and shoals. Beyond these is the outer bay, which continues to broaden, and to deepen only very gradually towards the sea. This provides a very extensive estuary of shallow water, which becomes comparatively warm in summer and serves as the feeding ground for an immense number of smelts. The many streams emptying into the river offers ready access for the smelt to very extensive spawning grounds in fresh water, which are required in the spring by this fish. From these grounds the fry drop down into the upper parts of the estuary, where they find great quantities of small shrimp to serve as their food until they seek the shore or bottom and move seaward. This river system, with its estuary and shallow sea front, provides ideal conditions for the breeding and growth of smelts.

During the winter, smelts congregate in the protected water of the inner bay, which at this season is covered with such a thick layer of ice that the

fishermen can readily reach all parts of it. As the fish are in schools and somewhat torpid, owing to the water being below 32° F., they are easily taken in bagnets or box-nets, which the fishermen are able to anchor by long poles or stakes readily driven into the soft bottom of the shallow water through holes cut in the ice. In this way a most valuable fishery is provided at a time when other fishing is quite impossible.

In the Province of New Brunswick, smelt fishing ranks third in value in fishery production and amounts to from sixty to seventy-five per cent of the total catch of smelts in Canada. The importance of this fishery may be gathered from the following figures:—

Year	Lbs.	Value	Year	Lbs.	Value
1900.....	7,863,000	\$ 393,152	1922.....	6,268,000	\$ 731,151
1905.....	6,688,700	334,435	1923.....	4,321,000	582,203
1912.....	8,028,800	802,880	1924.....	6,397,500	844,730
1917.....	5,570,300	834,445	1925.....	4,669,200	718,149
1920.....	4,004,100	365,279	1926.....	5,940,000	850,913
1921.....	6,204,200	589,804	1927.....	7,019,800	—

The Miramichi district is the most important smelt-fishing centre in the world. It produces about three million pounds annually, or one-half of the total production in New Brunswick of about six million pounds. The production in Prince Edward Island in 1926 was 1,539,000 pounds valued at \$98,670; while in Nova Scotia for the same year the production was 1,581,000 pounds valued at \$165,630. In Quebec the production was 284,200 pounds valued at \$28,000.

Smelts are caught by gill-nets, bag-nets, and more recently by what are called box-nets, to some extent by hook and line, and by spearing. Bag-nets and box-nets are generally used in the larger centres of production, and are responsible for the greater part of the catch; they are usually operated through holes cut in the ice. Gill-nets are used chiefly in open waters before the fishing areas are frozen over, and are practical as a means of production where cold-storage plants are available for freezing. The number of gill-nets is rapidly declining, and there has developed considerable opposition to their use, particularly on the north and east coasts of New Brunswick. Gill-net fishing is permissible from October 15th to February 15th; and bag-net and box-net fishing is permissible from December 1st to February 15th. Freezing temperatures usually prevail during this latter period, and smelts then caught are generally sold and shipped to market in a frozen condition.

Our attention was called to the fact that extensions of a few days have frequently been made to the smelt-fishing seasons. In the past six years the season has been extended every year, with the exception of the year 1926. In 1922, there was an extension of thirteen days; in 1923, five days; in 1924, ten days; in 1925, thirteen days; and in 1927, eleven days. In 1928 many applications were made to the Department for an extension, but no extension was granted. We were informed that the refusal to grant any extension this year resulted in the maintenance of a higher price level to the end of the fishing season. There exists a very general opposition to such extensions. We are convinced that extensions are unnecessary, unprofitable alike to fishermen and smelt dealers, and that the practice is not supported by any substantial body of opinion in the districts affected. We recommend that no extensions of the smelt-fishing season be hereafter granted, and that the season be henceforth fixed by statute.

There has definitely developed in smelt-fishing districts, particularly in New Brunswick, a strong opposition to gill-net fishing before December 1st. It

is alleged that under the pretence of gill-net fishing, bag-nets and box-nets are frequently used before that date, contrary to regulations, and that, therefore, the season for all forms of smelt net-fishing should begin not earlier than December 1st. We believe that this change should be made in New Brunswick where the gill-net is fast going out of use by fishermen. In 1926 on the north and east coasts of New Brunswick 5,303 bag-net licenses were issued, and only 128 gill-net licenses. In the same year no licenses for either bag-net or gill-nets were issued in the Bay of Fundy section, and only one license was issued on the St. John River. We recommend that in New Brunswick the opening of the season for gill-net fishing be changed to December 1st. We recommend too that the same regulation apply to Prince Edward Island. Smelts are of little market value unless they are shipped in a frozen condition, and the sooner they are frozen the better is the quality of the fish. At present, smelts caught in the early season are kept as a rule some days before going to cold storage for later shipment. The postponing of the opening date of the season to the 1st of December when low temperatures prevail will result, we believe, in a larger return for the season's product, because of the improved quality. In Nova Scotia, particularly in the western parts, the season should be made the subject of careful investigation by officers of the Department before a decision is finally reached. In that province, the facts presented to us were too meagre to justify us in making any recommendation with respect to seasons.

In New Brunswick a system of grading of smelts has been established by custom rather than by law. The grades are 1, 2 and Extras, according to size. Representations were made informally to us that a legal standard of grading should be established. We believe that a new and definite grading fixed by regulation would be in the interest of the industry and of consumers, and we recommend that a standard should be determined by the Department, after conference with the dealers interested, and after a study of the requirements of the various export markets in this respect.

Smelts are largely sold in a frozen condition to dealers in the United States, where pending demand they are held in cold storage. The prices paid for smelts on the ice on the Miramichi River vary from 6 to 14 cents per pound, and at Richibucto from 7 to 12 cents per pound; the fish are all sold on commission; the commission paid to the commission merchant in the United States is from 7 per cent to 12½ per cent. There would not appear to be a sufficient profit to producers or dealers in New Brunswick, largely because there is no control or direction over the export of smelts to the United States markets. There is therefore an unnecessary fluctuation in prices. In view of the fact that the Maritime Provinces and Quebec constitute so largely the sources of supply of smelts on this continent, it should be possible, by co-operation among producers, or among producers and dealers, to establish more orderly methods of marketing. This would eliminate unnecessary costs, particularly in the number and amount of commissions paid, and it should yield a higher and more constant level of prices to the fishermen, as well as a safer margin of profit to the dealers.

Owing to the rapid growth and generally successful spawning and breeding of smelts in the chief rivers of northern New Brunswick, intensive fishing there is not, in our opinion, likely to result in a diminishing catch, and even if there should be a temporary decline, with some restriction of the fishery there should be a rapid recovery. In other districts, particularly in Nova Scotia and southern New Brunswick, conditions are not always so favourable, as in some cases the eggs are spawned in situations that preclude successful development. Here, where practicable, corrective measures should be applied. It is possible that restriction of smelt fishing to the larger sizes, even in successful breeding regions

like the Miramichi River, would result in an annual catch of smelts greater in quantity and higher in quality.

7. FRESH FISH

Our discussion on the marketing of fresh fish will relate largely to the cities of Montreal and Toronto; as what is true of them is characteristic of other domestic fresh fish markets. While the shore fisheries and the deep sea fisheries in the North Atlantic have been carried on for more than four hundred years, it was not until about twenty-five years ago that the marketing of fish in a fresh condition became a substantial part of the industry. Prior to that time, methods of preserving fish for food were limited to smoking, drying and salting. Freezing fish in order to preserve it, while long known, was introduced commercially in the Maritime Provinces about twenty-five years ago. Provision having been made for air freezing fish, cold storage plants at the coast, refrigerated railway cars, and cold storage plants at points of consumption, it became possible to ship frozen fresh fish further inland and thus develop new and wider markets.

Prior to 1908, the markets of Quebec and Ontario for fresh fish were almost entirely supplied by the New England States. Haddock from Portland was a staple in the fresh fish trade in Montreal, and fresh and frozen fish from Boston was also marketed there in quite substantial quantities. These points of shipment were less than half the distance from Montreal, compared with the Atlantic ports of Canada; the freight and express rates were much less; and even with a duty of one cent a pound in their favour, the shippers of the Maritime Provinces were unable to market any substantial quantity of fresh or frozen fish in Montreal, and still less in Toronto. In 1908, the Department concluded to encourage the sale of fresh fish from the Maritime Provinces in the central Canadian markets, and undertook to pay one third of the express charges on less than carload lots from Atlantic ports, to points west of the Maritime Provinces. From that time, Maritime Provinces fish obtained entry into these markets. While figures are not available to indicate the exact quantities annually shipped from the Maritime Provinces, the increase in volume may be seen in the progressive payments made by the Department as its proportion of the express rates. In 1909-10 the amount paid by the Department was \$15,-162.20, while in 1917-18 it was \$49,550.89. These figures indicate that shipments of fish by express increased three hundred per cent in eight years. As shipments increased in quantity, improved freight facilities were provided by the Intercolonial Railway, and refrigerated cars were gradually put into service. As a consequence of all this, by 1915 the markets of Quebec and Ontario were firmly secured for Maritime Provinces fish, and today they afford the best home market. By this time, too, shippers and distributors had already made successful advances into markets farther west, especially for finnan haddies, and smoked fillets. Retailers and wholesalers in the Montreal and Toronto Markets state that the quality of fresh fish from the Maritime Provinces has continued to improve until it is now superior to any other available sea-caught fish. If this condition continues these markets can doubtless be retained for Maritime Provinces fish.

For the purposes of this report, the term fresh fish, is to be interpreted as including not only unfrozen but also frozen fish, and fish that have been lightly smoked, such as smoked fillets, finnan haddies, and kippered herring. Cod, haddock, and flounder or sole, which frequent the sea bottom and are generally known to the trade as ground fish, form the staple varieties. For this there are several reasons; they are obtainable in quantities, the limits of which have not yet been reached; they are available at all seasons of the year; and the prices are reasonable.

As the demand for fresh fish in the markets of Quebec and Ontario is greatest on Wednesday, Thursday and Friday of each week, it is the usual practice of shippers to forward their largest shipments by freight or express so as to arrive on Tuesday, Wednesday and Thursday. In practice, therefore, fresh fish as a rule reaches Montreal or Toronto on specific days each week.

Ground fish are taken by steam trawlers, schooners of various sizes, and shore boats. On the steam trawlers they are cleaned, dressed and packed in crushed ice in "pens" or boxes. The steam trawler endeavours to make short and frequent trips, with the view of landing fish as soon as possible after they have been caught. Fish taken by boats and vessels are not usually iced on board, but as a rule are landed the day they are caught. After landing, fish intended to be marketed fresh is packed in crushed ice in boxes, each containing from one hundred and fifty to two hundred pounds of one variety only, the weight depending upon the season of the year. Because of its perishable nature, and distances from market, ground fish is not sold on view as is done in many places and the purchaser must therefore rely wholly on the shipper for the quality of the fish. Because of the limited consuming population adjacent to the points of production in the Maritime Provinces, it has not yet been found necessary to establish fish markets or exchanges at the landing ports, as is the practice in Great Britain and the United States.

Ground fish are shipped fresh in one of the following forms:—(1) in the round, that is merely cleaned and dressed, but with the head on; (2) headless, that is, not only cleaned and dressed, but with the head removed; (3) filleted, that is, the clear flesh of each side without skin, bones and fins. The cleaning and dressing of the fish involves a loss in weight of from 5 to 7 per cent, the removal of the head 25 per cent additional, and filleting a loss of from 55 to 67 per cent of the weight of the fish in the round. Smoked haddock, in the form of finnan haddie, represents a loss in weight of about 40 per cent; and cod in the form of smoked fillets a loss of 67 to 70 per cent.

Ground fish marketed in Montreal and Toronto is usually handled by a wholesaler or jobber before it reaches the retailer. In practice the shippers at the coast, every Thursday, either direct or through their agents in Montreal and Toronto, quote prices at which they will deliver ground fish the following week, either f.o.b. at the coast, or at these markets. Almost without exception the wholesalers in the markets of Quebec and Ontario expressed to us their preference for a stabilized price at the coast of from 5 to 7 cents per pound, instead of the lower and widely fluctuating price prevalent at times during the past few years. A fall in the wholesale price is not apparently shared in by the consumer, and the tendency is for the retailer to maintain the higher level of prices to provide for possible losses. It is also said that fluctuating retail prices are regarded with some suspicion by consumers. There is therefore, the anomalous situation of the retailer and wholesaler both preferring a steady and higher level of prices, yielding a greater return to both fishermen and shippers, while the shippers frequently lower the price in unprofitable competition with each other without any advantage to the consumer.

Not only are the Provinces of Quebec and Ontario the largest markets for fresh fish, but they also consume a considerable portion of the smoked fish produced in the Maritime Provinces. Complete statistics are not available to indicate the exact quantity of fish sold in these markets. We have, however, made a somewhat careful study of railway shipments both by express and by freight, for the year 1926, and we have also had estimates from the larger producers and shippers, and from the principal distributors in these Provinces. Upon this information we estimate that the markets of Quebec and Ontario at present purchase annually from the Atlantic coast the product of approximately 31,500,000 pounds

of ground fish in the round, and herring, mackerel, salmon and smelts; the Maritime Provinces themselves consume approximately 13,500,000 pounds annually; and the markets of Western Canada, the United States and elsewhere 45,000,000 pounds annually. In tabular form this estimate is as follows:—

Markets	Approximate consumption	Per cent of total
	Pounds	
Maritime Provinces.....	13,500 000	15
Quebec and Ontario.....	31,500,000	35
Western Canada, United States and Elsewhere.....	45,000,000	50
Total.....	90,000,000	100

We have also made an estimate, based on information obtained from the larger shippers at the coast, and distributors in Montreal and Toronto, of the quantity of ground fish sold and the form in which it is sold, in the markets of Quebec and Ontario, for the year 1926. In the following table, the weight of the fish, whether as fresh fillets, smoked fillets, finnan haddie or headless, is given in pounds of fish in the round and also in pounds as marketed:—

TABLE I

Form in which Marketed	Quebec		Ontario	
	Weight in pounds		Weight in pounds	
	Round	Marketed	Round	Marketed
Round and headless.....	8,500,000	8,200,000	1,800,000	1,400,000
Fresh Fillets.....	3,750,000	1,300,000	3,500,000	1,200,000
Smoked Fillets.....	2,850,000	875,000	4,700,000	1,500,000
Finnan Haddie.....	550,000	325,000	1,500,000	900,000
Total.....	15,650,000	10,700,000	11,500,000	5,000,000

There is much discussion of the price spread between the fishermen and the consumer in Quebec and Ontario. A fact too frequently lost sight of, when comparing retail prices in these markets with the prices paid to the fisherman, is that there is a loss in weight when the heads are removed, or when the fish is filleted. As already pointed out, when the head of a cod is removed 27 per cent of the weight of the fish in the round is lost; and in haddock the loss is 25 per cent. When a fish is filleted, from 55 to 67 per cent in weight is lost, depending on how closely it is cut, and when fillets are smoked 3 to 5 per cent additional weight is lost. It is evident therefore that the prices of headless or filleted fish must reflect these losses. For example, a shipper who purchases 100 pounds of haddock in the round, at say 2½ cents per pound, pays \$2.50. We will assume that the customer requires headless haddock, and thus a loss of 25 pounds in weight is at once incurred. The shipper therefore must receive \$2.50 for the remaining 75 pounds, or three and one-third cents per pound. It is estimated that when fish is filleted, three pounds of round fish are required to make one pound of fillets. Therefore when a shipper buys one hundred pounds of fish for filleting, he must receive \$2.50 for the resultant 33½ pounds of fillets or 17½ cents per pound to realize what he paid for the fish without any allowance for the labour of filleting or handling the fish.

The consumer in Toronto or Montreal pays, let us say, 22 cents per pound for filleted fish ready for cooking. The fishermen could of course convert the fish into this form, but as he usually finds this impractical he confines his work to catching, cleaning and dressing the fish. Further preparation of the fish, its handling and transportation until delivered to the consumer is left to others. Thus, between the producer and the consumer a number of middlemen intervene, such as fish buyers or shippers, railway companies or carriers, wholesalers, jobbers and retailers all of whom must be paid for their services.

It may be of interest to follow a transaction in fish purchased on the coast and sold to a consumer in Montreal. After the shipper receives the fish in the round at the landing stage, he must wash and pack them in ice in boxes, each box containing from 150 to 200 pounds of fish according to the season. If the weather is warm, more ice is required, and consequently less fish is put in the box. The shipper must maintain his plant; he must provide for the labour required in handling, washing and packing; he must purchase boxes and ice; he must transport the packed fish to the refrigerated car and there load it, and he must bear the expenses of management and marketing. For these services it is estimated that \$1.70 per hundred pounds of fish as landed is not excessive. This amount includes an allowance for shrinkage in weight from the time the fish is bought by the shipper, until it reaches the refrigerated car. Freight charges must be paid, and also charges for icing the car, while en route. The car icing charges vary with the season of the year. To this must be added the unloading charges at the point of destination. The average freight rate paid from the principal shipping points in Nova Scotia to Montreal including icing charges, is \$1.00 per hundred pounds. The following table gives the details of the transaction:—

TABLE II—ESTIMATE OF THE COST OF FRESH FISH, SHIPPED IN THE ROUND, AND LANDED IN MONTREAL

100 lbs. fish at 2½ cents	\$2 50
Handling, boxing, icing, loading and overhead expenses	1 70
Freight to Montreal including charge for icing cars	1 00
Shipper's profit, say ½ cent per pound	50
Delivery charges at Montreal and distributor's profit	1 00
Cost of 100 pounds of fish delivered to retailer	<u>\$6 70</u>

This fish landed in Montreal and delivered to the retailer has thus cost him \$6.70 for 100 pounds of fish purchased at the coast, or nearly six and three quarter cents per pound. It is usually sold at 10 cents per pound at "cash and carry" stores, or 12½ cents per pound, if delivered.

Headless fish is also shipped to the Montreal market. As pointed out, about 25 per cent of the weight of the fish is lost when the head is removed. When, therefore, the shipper at the coast purchases 100 pounds of fish, only 75 pounds remain to sell after the head is removed. The following table illustrates a transaction in headless fish sold in the Montreal market:—

TABLE III—ESTIMATE OF THE COST OF FRESH FISH SHIPPED HEADLESS TO MONTREAL

100 lbs. fish at 2½ cents (yielding 75 lbs.)	\$2.50
Handling, boxing, icing, loading and overhead expenses	1 70
Shipper's profit, say ½ cent per pound (100 lbs.)	50
Freight to Montreal including charge for icing cars (75 lbs. at 1 cent per lb.)	75
Delivery charges to retailer at Montreal and wholesaler's profit, 1 cent per lb. (75 lbs.)	75
Cost of 75 lbs. of fish delivered to retailer	<u>\$6 20</u>

This fish delivered to the retailer in Montreal costs him \$6.20 for 75 pounds, or about 8¼ cents per pound. For the purpose of these estimates we have assumed the shipper's profit to be one half a cent per pound on the fish in the round,

which is probably less than the amount to which he is reasonably entitled. Headless fish is usually sold to the consumer in Montreal at 12½ cents per pound at "cash and carry" stores and 15 cents per pound if delivered.

Different shippers gave us different estimates of costs for particular services. Apparently there is no uniformity in the cost accounting methods used by shippers, and indeed we doubt if some of them keep books of accounts in sufficient detail to enable them to determine their costs accurately. In attempting to estimate such costs we are therefore obliged to present two tables based upon information available to us from sources which differed somewhat widely in their estimates. These tables show the approximate cost of producing and delivering fresh fillets in Montreal. Table IV (A) is based on 33½ lbs. of fillets manufactured from 100 lbs. of fresh fish, while Table IV (B) is based on 40 lbs. The tables differ slightly on the cost of various services between the producer and the consumer. An estimate of the cost of producing and delivering fresh fillets of fish in Montreal follows:—

TABLE IV (A)—ESTIMATE OF COST OF PRODUCING FRESH FILLETS AND DELIVERY IN MONTREAL

100 lbs. of fresh fish at 2½ cents (33½ lbs. of fillets)	\$2 50
Cost of handling, filleting, boxing, icing, loading, and overhead expenses	2 00
Shipper's profit	50
Freight charges and cost of icing cars (33½ lbs.)	34
Montreal wholesaler's profit and delivery charges	50
Cost of 33½ lbs. of fillets delivered to retailer	5 84

Thirty-three and one third pounds of fillets have, on this basis, cost the retailer in Montreal approximately 17½ cents per pound, and he usually retails them at 22 to 25 cents per pound, or from \$7.33 to \$8.33 for this total quantity of 33½ pounds.

TABLE IV (B)

100 lbs. of fresh fish at 2½ cents (40 pounds of fillets)	\$2 50
Cost of handling, filleting, boxing, icing, loading, and overhead expenses	2 00
Shipper's profit	50
Freight charges and cost of icing cars (40 pounds)	40
Montreal wholesaler's profit and delivery charges	50
Cost of 40 lbs. of fillets delivered to retailer	5 90

On the above basis forty pounds of fillets have cost the retailer in Montreal, approximately 14¾ cents per pound and he usually retails them at 22 to 25 cents per pound, or from \$8.80 to \$10 for this total quantity of 40 pounds.

The cost of services rendered in delivering the fish from the shipper at the coast to the wholesaler in Montreal or Toronto, is not excessive. The largest part of the price-spread apparently occurs between the retailer and the consumer. It is said that a charge of 3½ cents per pound represents the average cost to the retailer for delivery to a household and that his general overhead expenses average 25 per cent to 35 per cent on his annual turnover. It would be desirable, if at all possible that the contact between the shipper and the consumer should be more direct. Retail prices vary considerably according to the class of shop vending fish. High class shops demand a greater price because of more efficient service and more costly equipment for storing and handling, and consequently a more reliable product, for all of which consumers must pay.

We are of the opinion that the central Canadian markets are capable of absorbing a much larger quantity of ground fish than they take at present. With the introduction of rapid freezing, to which process we refer at length in another paragraph, we feel that consumption will be increased; many stores which cannot now market fish will be able to handle rapidly frozen fish because of the convenience of the package, and the absence of many of the disagreeable

factors which are inseparable from the retailing of fresh unfrozen fish. We also believe that with a minimum of care this form of fish will reach the table of the consumer in a condition approximating perfectly fresh fish.

From the standpoint of the shipper there is much advantage to him in shipping fish in the form of fillets. As already observed, when fish are shipped in this form the waste resulting therefrom, if in sufficient quantities, may be converted into fish meal. In filleting 100 pounds of fish there is a waste of about 67 pounds. This waste may be converted into about 12 pounds of fish meal which sells for about 4 cents a pound f.o.b. Halifax. Assuming the cost of conversion to be $1\frac{1}{2}$ cents a pound there remains $2\frac{1}{2}$ cents a pound of fish meal, or a total of 30 cents for the 67 pounds of fish waste which otherwise would be thrown away. In addition, a saving of 67 cents is made in railway charges when 33 pounds of fillets instead of 100 pounds of round fish are shipped to the Montreal market. From the information available, we believe that by converting fish in the round into fillets and making use of the waste for fish meal, the shipper could increase his revenue at least one cent per pound of fish landed. We realize, however, that the demands of the consumer must continue to dictate the form in which fish are marketed. Consumption always regulates sales, and sales regulate not only production but the particular form of the product.

We were urged to recommend that the Department financially assist the carrying on of an extensive and systematic campaign of advertising fish. It was stated that a similar campaign some years ago, to which the Dominion Government had made a substantial contribution, had resulted in largely increased sales. We are informed that an extensive shipper of fish in the Maritime Provinces, who engaged the services of a competent woman to give demonstrations in the proper methods of preparing and cooking fish, experienced considerable success in subsequently increasing sales generally. The broadcasting of instruction in such improved methods would have beneficial results. There is no doubt, but that judicious advertising promotes an increased demand for the product advertised. But those who profit by such increased demand should therefore reasonably be expected to pay for the advertising. In the circumstances we are unable to recommend that the Department should at present grant a sum of money for this purpose. It is not improbable that a notable change may soon be made in methods of marketing fish, because of the probable success of rapid freezing processes. In the United States this method has been adopted and has already made substantial progress. The experiments carried on at the Atlantic Experimental Station have demonstrated that rapid freezing is commercially feasible, and that the particular process there devised is more economical than those used elsewhere. At present there is a prejudice against frozen fish in the markets of Quebec and Ontario. Consumers do not yet distinguish between air frozen fish and rapidly frozen fish. To overcome this prejudice it will be necessary to convince the public of the improved quality of rapidly frozen fish. This may be done by judicious advertising, and in this the Department might properly assist. Special attention should be paid to the advertising of the food value of fish products.

Complaints were frequently made to us of the practice of handling fish from boats and on landing stages with pitch forks. This practice is harmful to the quality of the fish, and should be discontinued. Any regulations which may be later enacted for the inspection of fresh fish should prohibit the use of the fork. The designing of a substitute for the fork might well be the subject of consideration by the Department. Our attention was directed to the practice of the fishermen on the Great Lakes, who carry in their boats ice on which their fish are immediately placed. Deterioration is thereby prevented and the fish reach the market in the best possible condition. This practice

should be emulated by fishermen in the Maritime Provinces. Greater care in the handling of fresh fish will result in an improved quality and ultimately a better price.

8. DRIED FISH

The dried salt fish industry has been conducted for so many years on the Atlantic coast of Canada that any general review of it is unnecessary. While this fishery usually has reference to codfish, it also embraces haddock, hake, pollock and cusk. Hereafter we shall refer to the product of this fishery as dried fish. The total production of dried fish in the Maritime Provinces and Quebec in the year 1926 was 683,000 cwt. of which 449,512 cwt. was produced in Nova Scotia; 173,259 cwt. in Quebec; 59,061 cwt. in New Brunswick; and 1,385 cwt. in Prince Edward Island.

This branch of the fishery industry may be conveniently discussed by reference to the industry as carried on in the Gaspé Peninsula in the Province of Quebec, and in the Caraquet-Shippegan district in the Province of New Brunswick, where it is chiefly carried on by boats and small vessels of various sizes, both inshore and offshore; and by reference to the deep-sea fisheries of Lunenburg County, Nova Scotia, where a bank fishing fleet of large vessels operates. We shall refer to certain characteristics and conditions of the trade as found in each of these two sections of the country, and this will be sufficiently descriptive of the whole of the dried fish industry on the Atlantic Coast.

The shore and offshore fisheries of this class have declined in recent years, but in the Gaspé Peninsula, and the Caraquet-Shippegan district, the decline is less marked. The general decline is due to various causes. Many shore fishermen have transferred their activities to the fresh fish business. Where fish may be conveniently marketed fresh, the fishermen usually receive a much better return than when it is marketed as dried fish. Fresh fish, selling at one and a half cents per pound, is the equivalent of about \$5.90 per quintal of dried fish; this does not include the cost of labour involved in curing, but it includes the cost of salt, estimated at fifty cents per quintal. In 1927 the average price paid for dried cod was \$5.50 per quintal. Fishermen producing pickled cured fish for the boneless fish trade, also usually receive a greater return than if their product were sold as dried fish. Again, while dried haddock brings a lower price than dried cod, in the fresh form it brings a higher price than cod, and is in more demand in the fresh fish markets. The decline is also attributable to various other causes, such as the abandonment of locations which have become unsuitable for prosecuting the industry, the adoption of more productive occupations by fishermen, the drift of young men to larger centres, which is characteristic of other occupations, and the periodic absence of fish on some shores. In certain sections of Quebec we were informed that highway construction and the production of pulpwood had withdrawn many young men from the shore fisheries, but we were also informed that during the present year it was expected there would be an increase in the number of shore fishermen.

In the Gaspé Peninsula and on the north shore of the River and Gulf of St. Lawrence, and part of the Labrador coast, cod is the principal fish taken, haddock and pollock being relatively scarce; it is almost wholly marketed as dried fish. In 1927 the total production of this fish was about 95,000 quintals. Light salted fish, produced chiefly on the south shore of the Gaspé Peninsula, is of the highest quality and usually commands a higher price than any other dried fish in the markets of the world. On the south side of Bay de Chaleur, in New Brunswick, where the quality of the fish is usually high, the quantity produced in 1927 was about 30,000 quintals. In 1927 on the Gaspé Coast the price paid to fishermen averaged about \$6.50 per quintal, while on the New Brunswick side of the Bay de Chaleur the average price was \$6.00 per cental (100 lbs.), with a reduction of 50 cents per quintal or cental during the summer season

when the proportion of the highest export grade was small. On the north shore of the River and Gulf of St. Lawrence the price paid to fishermen in 1927 was about \$5.50 per quintal. The catch here consisted largely of but one grade, only the poorest being culled for certain export markets; in former years it was the practice there to make three grades. The lower price paid for this fish was said to be due to their inferior quality, lack of grading, and the cost of collecting and delivering them to the point of export, which in some instances involved considerable distance and time.

A custom of the trade in connection with the dried fish business peculiar to a section of the Gaspé Peninsula, north of Shiphead, may be mentioned, because it is a practice not generally prevalent on the Atlantic coast. Here the fish, which are of a superior quality, are packed by the fishermen themselves for export to Italy. They are packed in casks of four quintals each, the prices last year varying from \$32.00 to \$36.00 per cask f.o.b. coastal steamers for No. 1 export grade, and \$2.00 to \$3.00 less for No. 2 grade. It is also a practice here for the fishermen to consign their fish to the Italian market through the principal local exporting houses; an advance of \$4.00 per cask less than the prevailing market price is made by the exporter; when an account of sales is finally rendered, a charge of 2 per cent as a selling commission is made, and also a charge of twenty-five cents per quintal for supervision and other items of expense incurred in handling the fish. On this section of the Gaspé coast a system of inspection of dried fish, established and administered by the Government of Quebec, is in force and has met with general approval. Another practice of the trade on the Gaspé coast between Newport and Perce, is what is known as the "draft" system,—that is, selling fish in a green state exactly as taken from the water, or, cleaned, with the heads off. It requires on the average one and one-half drafts of green fish as weighed before splitting to make one quintal of dried fish of the average dryness, a "draft" being 224 lbs.

The dried fish industry of Lunenburg County, principally cod, has been long carried on, chiefly from the port of Lunenburg, and usually in a very substantial and successful way. The average annual catch for the last thirty years was about 225,000 quintals. Appendices 7 and 8 furnished us by the Collector of Customs at Lunenburg, show the number of vessels engaged in the bank fisheries from Lunenburg County from 1896 to 1927 inclusive, together with the total annual catch for such years as reported to the Customs by the fishing vessels; and while the figures are only approximate they are no doubt fairly accurate. Appendix IX is a statement prepared for us by Robin, Jones & Whitman, Ltd. of Halifax, N.S., compiled from their own and other records, giving an estimate of the landings of each trip of the Lunenburg fishing fleet, the average price at which the fish of each trip was sold, and the total catch and average price for the combined fishing trips, for the years 1911 to 1927 inclusive. Appendix X is a statement prepared for us by Zwicker & Co. Ltd. of Lunenburg, N.S., giving an estimate of the average prices paid for dried fish in Lunenburg, N.S., from 1896 to 1927 inclusive. Appendix XI, prepared by the same company, gives an estimate of the average amount received by sharesmen fishing in Lunenburg vessels each year for the same period. It must be realized, however, that the average earnings of the sharesmen in the whole fleet of vessels does not give an accurate indication of the amount received by individual sharesmen. Appendix XII, also furnished by Zwicker & Co. Ltd. gives an estimate of the cost of outfitting Lunenburg vessels for the same period; this includes the cost of salt, provisions, lines and ship chandlery, but does not include anchors, dories or bait. A study of these appendices will yield a great deal of information regarding the Lunenburg dried fish industry.

The Lunenburg bank fisheries, conducted as a joint enterprise between the vessel owner and the crew of fishermen upon a sharing basis, have been so successfully carried on over such a long period of time, and under such experienced

direction, that the Commission feels there is little to suggest for their further welfare and development. Probably over 50 per cent of the dried fish produced in Nova Scotia is attributed to the Lunenburg bank fishing fleet. When we visited Lunenburg, a great portion of the catch for 1927 had not yet been sold; fear was expressed to us by many vessel owners, masters and fishermen, that the catch might have to be sold at unremunerative prices and that the outlook for the future of the industry was extremely unfavourable. We were told that the catch of 1926 was marketed below the cost of production. Shortly after our hearings there, however, the unsold catch was disposed of at an average price of \$6.50 per quintal, with the effect, we understand, of restoring faith in the continued success of the industry. During the past few years the market prices for dried fish have been low, largely because of an increased European production. The production of dried fish in Iceland, for example, has grown from about 250,000 quintals ten years ago, to 1,000,000 quintals in 1927. The dried fish trade of the United Kingdom has also increased; here the production consists largely of fish caught by steam trawlers, portions of which, unsuitable for the fresh fish markets, are salted and dried. Large shipments of this fish are forwarded on consignment to the Brazilian markets, where they sell at low prices, displacing certain Canadian fish.

The cost of production of dried fish has been influenced by the increase in the cost of construction of fishing vessels, in some cases nearly 100 per cent higher than in 1914. The cost of outfitting the Lunenburg fishing vessels has also risen very considerably in the last fifteen years, as is evident from the appendix already mentioned. The capital investment in the average fishing vessel equipped for operations is substantially large; this investment is burdened by the fact that many of the vessels are non-productive during several months each year. We infer that the tendency will be towards longer employment of the vessel in the fisheries each year. The more general adoption of motor power will give in practice a longer fishing season, and thus greater earnings, and will make possible more frequent returns to port, with the more frequent landing of fish.

Several suggestions were made to us at Lunenburg by members of a committee representative of vessel owners, masters and fishermen. One was that the Government should assist by way of a loan in the erection there of a central drying plant; this we understood to mean buildings with extensive grounds, equipment adequate for washing, moving, drying and storing fish in order to encourage the buying and selling of fish in a green salted state, and curing them to meet the requirements of different markets. Under the present practice, fish as taken from the vessels are widely distributed to persons known as "fish driers" to be dried; they are then sold to the trade. No definite plan for the erection and operation of such a plant was placed before us. We believe, however, that with such centralization at Lunenburg of the curing of the largest percentage of the total catch, there would seem to be an excellent opportunity for obtaining a uniformly high-grade fish, and for reducing the labour and expense involved, thus giving an increased return to all concerned. If the present practice continues, of drying fish for the producer, and not directly by or for the exporter, we are convinced from the representations made to us at Lunenburg, it should be concentrated at a few locations where there is an abundance of ground, water, buildings and general facilities for drying and storing large quantities of fish. At present the drying is carried on in widely separated and ill-suited places. Drying should not be done in places by the side of motor-travelled roads—a practice which we heard much criticized at Lunenburg, and one which had to be abandoned in the Caraquet-Shippegan district in New Brunswick. We are unable to recommend financial assistance to the proposed central fish drying plant; the project is not sufficiently developed or matured; but if it later assumes definite and practical form, and assistance is found to be

necessary to its realization and success, we commend it to the favourable consideration of the Department.

While the quality of Lunenburg dried fish meets the requirements of certain markets, yet a higher standard of quality generally would make export possible to a greater number of markets and thus avoid at times excess exports to the customary markets. There seemed to be a very definite opinion among many of the masters of vessels and among fishermen, who appeared before us at Lunenburg, that the practice of selling the catch, or a portion of it, in a green state to exporters should be adopted, with the view that such a method would assist in the production of a higher grade of dried fish, and make possible a greater diversity of markets. It would also permit prompt settlement with fishing sharesmen, whose returns are sometimes long delayed because of postponed sales; and it would encourage fishermen in their calling. Such a departure from the present method has great merits. However, this lies wholly in the hands of those engaged in the industry, and it cannot be hastened or retarded by any suggestions from others.

A bounty on the production of dried fish was suggested to us at Lunenburg as a means of assisting the industry. This was supported by the contention that France was thus assisting its dried fish trade. We are informed that the bounty formerly granted by France to this class of fish terminated in 1926. Upon the facts put before us, we do not see any sound grounds for recommending the adoption of this suggestion.

In view of the present keen competition in the world's markets, among producers of dried cod, and the strong position occupied by exporting countries like Norway and Iceland, largely because of the quality of their products, it was very generally stated to us at Lunenburg that some system of grading and inspection was necessary. On December 17th, 1927, there was gazetted a copy of an Order of the Governor General in Council establishing standards of size and quality of dry and green salted fish; this was done after consultation between those engaged in the trade and officials of the Department. Any buyer or seller of fish bought or sold upon the basis of these grades or standards may request the services of an Inspector to determine whether or not the fish are in accordance with the standards; and on completion of the inspection, the inspecting officer shall give both the seller and the buyer a written report of the result of his inspection. The standards established may not be acceptable in detail to everybody, but experience will soon demonstrate whether or not amendments are necessary. Meanwhile, the adoption of standards is in accord with the representations made to us at Lunenburg and elsewhere, and will doubtless prove a great factor in improving the condition of the industry. This should meet the complaint of the fish buyer that he is compelled to pay the same price for all grades of fish, and also the complaint of the fish producer, that he must accept the same price for a superior grade of fish as that paid to others for an inferior quality. The standards established now apply only when fish are sold and bought on the basis of such standards. We recommend that the grading and inspection of dried fish for export be made obligatory for the year 1929. A buyer wishing to purchase fish on the basis of these standards will be at a disadvantage, if others are willing to buy ungraded fish. It is, however, within the power of fish buyers to make the standards fully effective at once by applying them to all purchases. Inspectors are, in our opinion, only necessary at the large producing and distributing centres.

Much better feeling we think would prevail between producers and exporters in this class of fish trade, if its economic position were thoroughly understood. The creation of an intelligence branch such as we recommend in another paragraph would perform a valuable service. The regular publication and circulation by it of information respecting the volume of production and stocks on hand in all competitive producing countries, the market conditions as to supply and prices in consuming countries, and any other data would be inval-

able. If information of this character were known to all sections of the industry, it would do much to allay suspicion and mistrust between fish exporters and the owners, masters and sharesmen of fishing vessels, and would probably aid in a more orderly marketing of the annual production.

We also recommend that to the principal producing and consuming countries of dried fish, there occasionally be sent groups of men, representatives of all classes engaged in the industry, to study and observe the customs, conditions and requirements of the trade in such countries. If such were encouraged and assisted by the Department, we think good results of a general and particular character would follow. Those selected should be required upon their return home to devote some time to reporting and discussing, with the classes whom they represented, the results of their observations and experience. We further recommend that investigations be carried on with a view of ascertaining if further markets for dried fish are available, and, acting upon a suggestion made to us, we would specifically advise the immediate appointment of a special investigator to explore the possibilities of a market in Africa for this product.

We give below some statistical information regarding the principal export markets of Quebec and the Maritime Provinces for dried fish, and the export markets of a few other countries producing the same kind of fish, which may be of some interest. Canadian exports of this fish are practically all produced on the Atlantic coast of Canada. We regret that portions of these statistics are not of recent years, and in the case of Iceland we have not been able to obtain recent statistical information which would be of value.

The principal export markets for Atlantic coast dried fish are the British West India Islands, United States, Cuba, Porto Rico, Brazil, Italy and Portugal. To these markets from Canada alone there was exported during the fiscal year ending March 31st, 1927, dried fish of the following quantities and values:—

	Weight in cwts.	Value
Bermuda.....	3,055	\$ 21,983
British Guiana.....	4,757	33,279
British Honduras.....	350	2,514
Barbadoes.....	5,069	38,943
Trinidad.....	34,606	229,618
Jamaica.....	52,156	354,937
Brazil.....	27,436	344,651
Cuba.....	106,791	785,667
Haiti.....	3,419	24,141
Italy.....	95,937	835,038
Portugal.....	13,140	90,702
United States.....	140,706	1,043,147
Porto Rico.....	116,092	784,904

Dried codfish is exported from Canada to many other countries besides those mentioned; it is also marketed abroad, green salted, or pickled. These figures, it should be understood, do not include fish such as haddock, pollock, hake or cusk.

In 1925 Norway exported to the countries below mentioned dried cod of the following quantities and values:

	Quantity	Value
	lbs.	\$
Portugal.....	30,013,479	4,154,200
Spain.....	21,004,445	2,949,725
Cuba.....	8,753,681	1,377,600
Brazil.....	7,067,333	1,201,350
Argentine.....	7,544,763	1,293,825

In addition, Norway exported to the same countries salt haddock, and many other varieties of salted fish in very substantial quantities.

The chief imports of codfish into Cuba for 1924 were—from Canada, 11,099,328 lbs. valued at \$955,108; from Norway 10,230,993 lbs. valued at \$927,525; from the United Kingdom, 1,044,876 lbs. valued at \$114,602 and from the United States, 3,685,937 lbs. valued at \$358,786. We were unable to obtain recent statistics showing the exports of dried codfish to Porto Rico by countries. The trade figures of that island are included in the general trade statistics of the United States. A report of the Governor of Porto Rico for the year ending June 30th, 1926, states that the total imports of dried codfish amounted to 17,826,016 pounds valued at \$1,455,676. The quantities and values of imports of dried codfish into Brazil in 1925, were chiefly as follows: from the United States 654,319 lbs. valued at \$89,802; from Great Britain 18,398,813 lbs. valued at \$2,356,858; from Norway 8,219,325 lbs. valued at \$1,111,985; from Canada 5,067,561 lbs. valued at \$609,821; and from Newfoundland 17,322,639 lbs. valued at \$2,163,727.

The importations of dried cod by the United States for the calendar year 1926 amounted to 36,808,428 lbs. of the value of \$2,793,629. The principal countries from which these importations came were: Norway, 1,687,296 lbs.; United Kingdom, 776,907 lbs.; Canada, 24,880,106 lbs.; and Newfoundland, 8,504,970 lbs. The exports of the same class of fish from the United States were to very many countries, the total amount exported being 3,954,342 lbs. valued at \$423,937. Some of the principal countries to which this fish was exported are Costa Rica, 142,474 lbs.; Panama, 710,474 lbs.; Mexico, 758,360 lbs.; Cuba, 1,119,482 lbs.; Haiti, 173,859 lbs.; Venezuela, 143,875 lbs. We have mentioned only the countries to which the exports were in quantities of one hundred thousand pounds and over.

The exports of dried cod from Newfoundland and the principal countries to which it was exported may be of interest. For the year ending June 30th, 1926, they are as follows:

	Quintals	Value
United Kingdom.....	27,380	\$ 212,790
Canada.....	20,471	136,549
British West Indies.....	107,652	991,230
Malta.....	2,195	23,598
Brazil.....	212,596	2,309,537
Foreign West Indies.....	82,279	801,070
Greece.....	56,545	356,435
Italy.....	134,425	1,220,991
Maderia.....	10,855	113,333
Portugal.....	295,711	2,482,060
Spain.....	414,046	3,394,207
United States.....	2,276	23,270

9. HERRING.

The herring is traditionally regarded as the example of the exhaustless resources of the sea as fishing by man makes so little impression on its abundance. It is found along the entire Atlantic coast of Canada and is taken in quantities of from one hundred million to over two hundred million pounds annually. It tends to be a seasonal fish in northern waters, where it is found near the coast only during the summer, while in more southerly waters, particularly at the mouth of the Bay of Fundy, it may be taken during a much longer season and even throughout the entire year.

It is remarkable that in the waters of Charlotte County, New Brunswick, at the mouth of the Bay of Fundy, there is taken annually from thirty to over forty per cent of the total catch on the coast. The quantity for this county is from fifty to eighty million pounds, and yet the frontage of this county on the bay is only thirty-five miles, compared with over two thousand miles of the entire coast line. The reason for the extraordinary abundance of herring within such narrow limits are several. There is an exceptional spawning ground at the southern end of Grand Manan Island where in August, over an extensive area of shoals and ledges, the water is of suitable temperature from the surface to a depth of thirty fathoms. The narrow entrances to Passamaquoddy Bay surge with strong tidal currents which bring up deep water to refertilize the surface layers and to furnish a steady supply of food for the herring at all stages. This mixing process has another effect. It equalizes the temperature from top to bottom, throughout the year, so that the herring can readily be taken in weirs close to the land during a very long season, and in the outer waters even throughout the year.

While the adult herrings are taken to some extent in the spawning condition in these waters, the fishery is almost wholly for the small immature fish, the majority of which are canned as sardines. This taking of enormous quantities of young fish, from one to two years old, has continued uninterruptedly for decades without diminishing the supply. It is safe to state that nowhere in the world is there a comparable herring fishery. The fish of medium size are very fat, and many are lightly smoked as kippers, or, in very large quantities, hard smoked and boxed as boneless herring.

Elsewhere on the coast the immature herring are not very often to be taken close to the shore, so that the fishery is largely for mature spawning herring, which are of an inferior quality but which may readily be taken when they congregate near the shore in certain localities for the purpose of depositing their eggs. If the fishery were prosecuted in deep water with proper appliances to locate the schools of fat herring, a higher grade would be taken and the fishing season could be very considerably extended. This would involve considerable expenditure in equipment, and would take time to develop. It should be considered as the logical direction for expansion, as soon as a rise in prices results from broader markets and a better quality of product.

The exports of pickled herring have been declining for some years and exporters are now heavily over-stocked owing to a lack of market demand. This has affected the condition of fishermen in certain sections of the Atlantic coast. The consumption of pickled herring in the usual markets appears to be gradually diminishing, notwithstanding the abnormally low market prices prevailing in recent years. The lack of markets is reflected in Canadian exports of pickled herring, which for the fiscal year 1927 were 52,265 cwts valued at \$182,963 as compared with 88,234 cwt. exported in 1923 valued at \$257,551. For the five-year period 1910 to 1914 the average annual Canadian export of pickled herring was 89,000 barrels; for the five-year period 1919 to 1923 it was 60,000 barrels; while for the three-year period 1924 to 1926 it was 30,000 barrels. The decline in the pickled herring trade may also be seen from the imports of that fish by Canada from Newfoundland, most of which, we assume, was for re-export. For the eight months ending November 30, 1927, these imports were nearly 3,000,000 pounds valued at \$50,277, whereas for the fiscal year ending March 31, 1923, they were almost 8,000,000 pounds valued at \$153,228. Canadian exports of pickled herring to the British West Indies and the United States show a steady decline.

It is generally conceded that the quality of herring pickled in the Maritime Provinces is not of a high standard. Any pronounced improvement in

this respect would doubtless mean an increase in sales. While the quality has somewhat improved since the Fish Inspection Act of 1914 came into force, the improvement is visible only in certain localities, and everywhere there is much room for progress. We were told that retailers find it difficult, and in many places impossible, to obtain sufficient pickled herring of a suitable quality for local markets. More rigid inspection of herring at the principal points of production or export, together with aggressive instructional methods, would do much to remedy the condition. Large quantities of smoked herring are annually exported from the Maritime Provinces, and by the production of a higher quality of this article, and a strict observance of the regulations regarding the quantity in the packages, the volume could be greatly increased. Ten thousand cases of canned herring were exported to a foreign market by Connors Brothers Limited of Black's Harbour, N.B., in 1926, but owing to adverse economic conditions prevailing in the importing country there were practically no sales there last year. Boneless canned herring is also produced in the Maritime Provinces, and the quantity is possible of increase. It would seem therefore that there is an opportunity for exporting canned herring in substantial quantities to markets that have not, as yet, been sufficiently explored. Brine frozen fresh herring will possibly find further domestic and foreign markets.

We recommend that provision be made for instruction in the curing of herring. Greater efforts should be made to enforce the regulations governing grading, packaging and inspection. Special study should be made with a view to ascertaining the requirements of various markets for herring in forms other than pickled.

10. *Mackerel*.—The mackerel is essentially a summer fish; only occasionally is it taken during the cold season of the year, and then only in outer waters. This fish is not so generally distributed as the herring, but is largely restricted to the warmer waters, such as the southern part of the Gulf of St. Lawrence, and the outer coast of Nova Scotia. During the month of May it makes its appearance in the latter waters and later in the Gulf of St. Lawrence.

Although the abundance of mackerel has varied greatly in the past, there is no definite indication of a decrease in the stock. The catch in any locality is subject to wide variations, so that fishermen are not infrequently quite unprepared to care for large numbers suddenly available. Gill-nets, either drifting or anchored, and trap-nets are generally used. It was urged at several places that the use of the purse-seine within territorial waters should be permitted. We see no objection to this, and we recommend that the regulation prohibiting its use within territorial waters be repealed, and that it be hereafter permitted subject to whatever regulations may appear necessary.

In the spring, when the mackerel are spawning they are of poor quality; nevertheless, while the catch has declined during the last thirty years, there is still a considerable quantity of pickled spring mackerel marketed at prices which frequently yield satisfactory returns to the fishermen. They are sold also in a fresh and frozen condition. The demand for the spring catch of mackerel in the British West Indies seriously declined last year as compared with former years, leaving exporters with heavy stocks on hand. The decline of exports to Jamaica was particularly noticeable. The catch of fat mackerel has also diminished in the past few years. The United States markets ordinarily take the available supplies, both fresh and pickled, at remunerative prices, but the unusual increase in the catch of mackerel in that country in the last two years has resulted in a decreased importation of fresh mackerel from the Maritime Provinces, and low prices have consequently prevailed. The decline in the value of mackerel exported is indicated by the statistics of exports for the fiscal years 1923 and 1927. In the former year the value was \$529,819, while in the latter it was \$367,246.

There is great need for improvement in the quality of pickled mackerel. In several places this was openly acknowledged, and practical instruction by competent persons was requested. In the Caraquet-Shippegan, N.B., district, we were told that the art of pickling or salting mackerel had been practically lost in recent years. Instruction is needed in that section, and in fact was urgently requested. At the chief points of production, or export, the inspection of salt mackerel should be more regularly and rigorously carried out.

For both pickled mackerel and herring, we recommend that the Atlantic Experimental Station at Halifax not only continue but expand the policy of sending competent instructors to inform fishermen in the leading fishing districts as to the best methods of curing, packing and packaging these varieties of fish. For a short time, at least, more instructors will be necessary in this connection. The market for fresh mackerel could probably be greatly extended by the use of rapid freezing. The canning of mackerel has been attempted, but not on any considerable scale, nor has it been accompanied by sufficient advertising to ensure success. We believe that there are possibilities in this direction, and that the rapid freezing of fresh mackerel may provide suitable stock for canning, the uncertainty of the catch otherwise tending to make operation of canning factories at present unprofitable; investigations and experiments should have the immediate attention of those best qualified in the service of the Department. There is probably an inevitable decline in the consumption of pickled mackerel; the maintenance of the present market demand, and any hope of increase in it, will probably depend on a change in packaging, so that the fish may be sold in small units by retail shops. We are told that even the large increase of small apartment houses has caused a noticeable decline in demand for fish of this kind because of the lack of storage for the usual large packages. The exporter himself must introduce new methods of packaging. In this, however, he requires the assistance of competent investigators.

11. The Canning Industry.—In making brief reference to the canning of fish, we do not include the canning of lobsters. The canning of fish, other than lobsters, has not yet been extensively engaged in throughout the Maritime Provinces generally. The greatest output is that of sardines, in which the largest industry is carried on by Connors Brothers, Limited, at Black's Harbour, Charlotte County, New Brunswick. In 1926 the catch bought by this company was 171,637 barrels, valued at \$256,728 to the fishermen; the number of cases of sardines canned was 217,592, valued at \$980,472; and 122,670 barrels valued at \$192,016 were sold in fresh and smoked state. In 1927 this company packed 280,000 cases of sardines, and this year they expect to can 350,000 cases. The canned product is shipped to over seventy different countries. The success of this industry has been rapid and has resulted largely from the wealth of the natural breeding grounds to which the cannery is adjacent, to initiative and care in management, to the quality of the product, and to aggressive sales organization. The greatest competitor of this Canadian sardine is the Norwegian product.

Last year licenses were issued to 48 canning establishments in the Maritime Provinces, exclusive of lobster canneries, 9 in Prince Edward Island, 14 in New Brunswick and 25 in Nova Scotia. One license was issued in the Magdalen Islands for canning codfish. Of this number, 28 licenses were issued to cannerymen of clams. In New Brunswick the total production of clams in 1926 amounted to 27,278 barrels, valued at \$111,362, and in Prince Edward Island, 5,161 barrels valued at \$61,898. No statistics for Nova Scotia were available. Notwithstanding this large production, we believe that this industry has not been developed to its full capacity. The demand for clams of good quality in the Canadian and United States markets is said to exceed the supply. There is little doubt but that the demand could be increased, and there would seem to

be a good opportunity now for extending this industry, particularly in Prince Edward Island and parts of Nova Scotia, where the clam areas are prolific and where production has not hitherto been excessive.

Scallops and oysters are canned in small quantities, but as production increases the canning of these fish will doubtless increase. In Prince Edward Island a factory is operated by Mr. C. F. Miller at Victoria for the canning of crab meat. This is a pioneer industry, but with adequate attention to quality it gives promise of success. Experiments in this industry might well be made in other parts of the Maritime Provinces.

Other fish canned in the Maritime Provinces, in varied quantities, are salmon, herring, mackerel, haddock, cod, finnan haddies, halibut and tuna. The canning of tuna has only recently been attempted, but it is said that the future of this infant industry has considerable promise of success, as the canned product is of a superior quality. The commercial possibilities of canned fish, of all varieties, other than shellfish and sardines, have not yet been sufficiently explored, nor have the markets been sufficiently investigated or tested. There would seem to be a promising field for expansion in the canning of fish of all kinds. We recommend that the Department, through the Atlantic Experimental Station, carry on extensive investigations on the most improved methods of canning the various fish products included in this young and growing industry, and that every possible assistance in the way of instruction and advice be given to those engaged in its development. Such assistance is not, we believe, beyond the scope of the National Research Council, and should be amply and generously provided. The Department of Trade and Commerce should continue to give assistance through its Trade Commissioners, or otherwise, in exploring more fully the possibilities of foreign markets for canned fish products, and in making the information gathered available to packers. Mr. B. M. Hill of the Connors Brothers Ltd., publicly expressed to us his appreciation of the aid rendered to that company by Canadian Trade Commissioners in various parts of the world. We recommend that inspection of all canned fish products should be required, to ensure a standard quality.

12. SALT

Many complaints were made to us, particularly in Gloucester County, New Brunswick, and in Cape Breton Island, that some of the fisheries salt in the market in 1927, was unsuitable and that its use resulted in considerable damage. Many who used the same salt, however, did not have the same unfortunate experience. As the various grades of salt in some instances differ rather markedly,—with individual advantages for certain types of cure,—and therefore require somewhat different handling, we suggest to the Department the importance and advisability of affording to users of salt full information on the characteristics of the various commercial salts, and their relation to the curing of different kinds of fish. This would require periodical testing, as the characteristics of salt vary from year to year. It is not desirable in our opinion that a definite specification should now be set for fisheries salt, for the requirements frequently differ. If, however, complaints continue to arise regarding the quality of fisheries salt on the market, the Atlantic Experimental Station should be asked to establish standards or grades, after consultation with those engaged in the trade.

Salt is imported in bulk, but frequently the trade distributes it to their customers in bags with nothing usually thereon, to indicate the name of the particular salt. We recommend that dealers be required to stencil on bags the name of the salt contained therein, or to write the same on a tag attached to the bag, and also to specify, where possible, the special grade of the salt.

IV

AIDS TO FISHERMEN

1. NAVIGATION

(a) *Harbours, Lights, Buoys, etc.*—Numerous representations were made to the Commission respecting the construction or reconstruction of breakwaters and wharves; the dredging and improvement of harbours; and the need of aids to navigation, such as lights and buoys. Requests for such public works were based usually upon the argument that they were important and necessary in the development and maintenance of the local fishing industry, but in some instances they were supported upon the broader grounds of navigation and commerce generally. The representations made to us were very general in character, and seldom contained precise information as to cost, utility or practicability. In some cases where surveys had already been made the reports of engineers of the Department of Public Works were available.

It was not possible for us to conduct any enquiry as to the necessity, cost or utility of such suggested public undertakings, and we can only transmit with this report a list of the improvements so requested. We recommend that as soon as possible a complete and adequate survey, respecting each of them, be made by the proper Department of Government and that the requisite action be then taken. In several places where no harbours or adequate shelters exist and where boats must be hauled far up on the beach for safety, the need for capstans or hauling winches was emphasized. We submit herewith a list of such places, and we recommend that careful investigation of the difficulties and requirements be made by the Department.

(b) *Meteorological Service.*—There seems to be a general desire on the part of fishermen for the regular and widest possible distribution of weather reports and storm warnings in fishing communities and on the fishing grounds. We shall transmit to the Department a list of the places where the installation of storm signals and the furnishing of weather reports were requested. The Department at the present time seems to be making every reasonable effort to meet the demand for these services, and it may be of interest to state just what is now being done, and what is in contemplation.

Meteorological observations for the purpose of making weather forecasts are taken at Vancouver, Prince Rupert, Dawson, the mouth of the Mackenzie River, Newfoundland, Hudson Straits, and Belle Isle, every day, at 8 a.m. and 8 p.m. Eastern Standard Time. The results of these observations give barometer and thermometer readings, the direction and force of the wind, local conditions, etc., and this information is all telegraphed to the Central Meteorological office at Toronto. This, together with reports from Europe and the United States, are plotted on a Weather Map from which the Weather Forecaster makes his predictions of what the weather will be in designated areas, with considerable certainty for the next twenty-four hours, and with somewhat less certainty for the next following twenty-four hours. We are informed that of the daily weather forecasts made during the year 1926-27, 87.7 per cent were verified, and of storm warnings 93 per cent.

The bi-daily forecasts are issued at 10 a.m. and 10 p.m. each day and are telegraphed to all parts of Canada and Newfoundland. They are published in the daily newspapers, displayed in railway and shipping offices, telephone offices, municipal buildings, hotels, etc., and they are forwarded to Coastal Radio Stations for the information of ships in Canadian waters, or ships bound to Canadian ports. In addition, the 10 p.m. forecast is given to Radio Broadcasting Stations, which put it on the air.

Evidence of an approaching storm is indicated to the Forecaster in his study of the weather map; and, if, in his judgment, a storm is imminent over land or sea, he watches the progress of the disturbance with particular care, and, as far in advance as possible, he sends out storm warnings to the areas that are likely to be affected. These storm warnings are sent by telegraph to the storm signal display stations, and to coastal radio stations. At the former a visual signal is displayed, and at the latter, the warning is broadcast in code to ships at sea. There are about 110 storm signal display stations in Quebec and the Maritime Provinces.

The value of the weather forecast depends almost entirely upon the rapidity with which it reaches the person who requires the information, and in the case of storm warnings speed is of great importance. In the cities and larger towns, the telegraph and telephone companies give a twenty-four hour service every day of the week. This unfortunately is not the case in many of the localities at which there are storm signal display stations. In many localities there is only a part time telegraph service; in many places the operator goes off duty usually at 6 p.m. and does not resume again until 8 a.m. the following day. There is no service on Sundays, except where the Department, as it does in a large number of cases, pays a telegraph operator to come on duty to ascertain if any storm warning message is awaiting. We suggest that the making of similar arrangements with telephone offices be considered by the Department.

Radio broadcasting appears to offer the largest measure of relief from the disabilities of the present system of communication by land lines, both telegraph and telephone, and the Department is at present using broadcasting stations for the dissemination of the weather forecasts and storm warnings. In the Maritime Provinces weather forecasts are put on the air by some of the following stations:—CNRA Moncton; CHNS Halifax, CFBO St. John. The Department recently made extensive experiments throughout the Maritime Provinces with a view to ascertaining exactly over what areas forecasts can be received from these stations. These experiments were successfully carried on from broadcasting stations at St. John, N.B., and Halifax, N.S., and proved of great value to radio equipped fishing vessels on the fishing banks.

In addition to these stations the Department has inaugurated a new radio broadcasting service from Louisburg, N.S. This station has power of the order of 4,000 watts. It is designed to give, twice daily, to fishing vessels on the fishing grounds information regarding weather forecasts, storm warnings, time signals, bait movements, and general news of the fisheries, and it is expected that this information will be picked up all over the Maritime Provinces, and by fishing vessels at sea furnished with radio receiving sets. If this service will not satisfactorily cover the Maritime Provinces, the radio broadcasting service on the Halifax and Lurcher Lightships will be utilized.

2. FISHING OPERATIONS

(1) *Bait Freezers*.—We were informed in many places that fishing operations were frequently interrupted by the lack of bait, and many requests were made for assistance in establishing bait freezers. From 1900 onwards, for several years, the Federal Government assisted fishermen's bait associations, of not less than twenty members, to establish small bait freezers by paying half the cost, not exceeding \$2,000, and a bonus on bait frozen of \$5 per ton, up to twenty tons, during the first five years. The story of these bait freezers is a story of failure. Unfortunately when the bonus period ended, the majority of these freezers were no longer operated by the fishermen's bait association; indeed in some cases they were closed even before the termination of the bonus

period. In some instances, however, they were operated successfully for a brief time because of the initiative and the interest of a single member of the fishermen's bait association, rather than by the association itself. It is possible that when this policy of assistance was in force, frozen bait was not so highly regarded as it is now; that co-operative efforts by fishermen were not so hopeful of success as they are at the present time; and that, therefore, the failure of the policy may be attributed to the early time of the experiment rather than to its lack of merit or feasibility.

Later, under a modification of the above policy, the Department granted financial assistance in the establishment and maintenance of small freezers to those who were prepared to go into the fresh fish business, and who would undertake to keep in stock a supply of bait available to fishermen in the desired quantities and at current market prices. Under this policy, freezers were established at Port Hood, Hillsboro, Whitehaven, Grand Etang and Goldboro in Nova Scotia, and at St. Andrew's, New Brunswick. But only one of the freezers thus assisted was successful, and even it did not always carry a stock of bait available to fishermen.

In many seasons bait is readily and cheaply available to fishermen, and in such years freezers are of no great use. The demand for frozen bait is, as a rule, inconstant. Largely for these reasons the financially assisted bait freezers were, in the past, unsuccessful. Even if some form of assistance for the construction of bait freezers is justifiable, there are inherent difficulties in ensuring their continued maintenance. Several private cold storage plants now carry bait available for purchase by fishermen, and these, in a large measure, meet the requirements in certain localities. In recent years, too, fresh fish buyers and distributors conducting business on a substantial scale, have carried stocks of bait available to fishermen from whom they buy fish, and also to others. It is extremely difficult to state with confidence where assisted bait freezers should be established, even if such a policy were adopted. Small bait freezers can be easily designed and cheaply constructed, to make bait readily available to associations or groups of fishermen, or even to individual fishermen. Further, brine freezing or rapid freezing of bait may soon change the entire situation in such a way as to make it imprudent to inaugurate any policy designed merely to meet the actual conditions of today. In some places in the Maritime Provinces, bait freezers have been privately constructed at a very moderate cost. The subject deserves careful consideration by the Department and a thorough survey of the requirements of fishing localities, before any definite policy is formulated.

There are doubtless many sections of the Atlantic Coast where assistance in the establishment of bait freezers would be of great value, or where it may be necessary in the successful prosecution of the fisheries. Where such necessity exists to the satisfaction of the Department, we recommend that assistance in some form be given to the extent required; but assistance in the establishment of bait freezers to individual fishermen cannot be recommended. If assistance is given, it should be where and when fishermen have been organized for co-operative effort, and where they have, in some way, established evidence of the necessity for a bait freezer and of its continued operation. Meanwhile, we recommend that a simple and inexpensive bait freezer be designed by the Department, with simple specifications for construction, and details of necessary material and probable cost, and that the instructions and information so provided be made available for individual fishermen, or groups of fishermen, who may, at a minimum outlay, desire to build and operate a small freezer.

It is not improbable that rapidly frozen bait may be found preferable to fresh bait, as the former will keep fresh longer under the same conditions. As the Atlantic Experimental Station has already developed a rapid-freezing apparatus operated with ice and salt, we recommend that the Station be asked

to design a suitable brine freezer for bait, and that any fisherman, group of fishermen, or dealer, who may desire to make use of such a freezer be given the requisite advice and instruction to insure its successful construction and operation.

(2) *Cold Storage Plants.*—Many representations were made to us at many places as to the desirability and utility of cold storage plants and bait freezers. In respect of cold storage plants as a factor in the marketing of fresh fish, especially cod and haddock, it is evident that much misapprehension exists. The misapprehension is in the belief that fresh fish are marketed in a frozen condition; this is only partly correct; it is usually true of some fish such as herring, halibut and salmon. Cod and haddock in the round, or filleted, are sold fresh and not frozen, in the markets of Quebec and Ontario. There may be exceptions to this, but we are stating the general practice which to-day is different from that of former years. Fresh fish in the form, say, of fillets, including smoked fillets, are only frozen when about ten days are required for transportation. The freezing is done by the dealer or distributor. Unless the producer is a distributor, engaged in the marketing of his fish, he has no need for a cold storage plant. Therefore, in our opinion, for the marketing of fresh cod and haddock under present circumstances, cold storage plants are necessary chiefly for the fish dealer or distributor alone. As a matter of general policy the construction of cold storage plants for fish alone, other than for probable co-operative organizations, should not be lightly entered upon or encouraged.

There seems to be a sufficient number of cold storage plants in the areas where fresh fish is produced in large quantities for markets outside of the Maritime Provinces, and even these are not usually prosperous. Experience would indicate that cold storage plants should be controlled or directed by persons or corporations engaged in some commercial activity, which would provide patronage for the plant. Cold storage plants erected merely for the purpose of warehousing the products of voluntary patrons, unassociated with any commercial or trading business, and without sufficient capital for properly conducting them, meet in most cases with failure, unless they are located in large centres where the warehousing patronage is substantial and regular in volume. However, we do not mean to discourage the payment of subsidies, under the Cold Storage Act, where it may be shown that co-operative marketing by fishermen is possible or practical and likely to be successful, but before granting any such application we think it desirable that full investigation should precede action.

In another paragraph we discuss the matter of brine freezing of fresh fish. There is no doubt, we think, but that the general adoption of this process may substantially change the fresh fish industry, particularly the form of marketing. It is difficult to foresee the exact consequences. To change from the marketing of fresh fish to brine frozen fish presents difficulties, as it will require considerable expenditure of time and money to induce consumers to adopt the latter. It will, therefore, in our opinion, come into use gradually.

For the present, it would seem that the Cold Storage Act fairly well meets public requirements; at least its limitations or deficiencies have not been pointed out. Should the brine freezing process later come into substantial use, cold storage plants at certain centres as a marketing adjunct may become a necessity, for the reason that fish subjected to this process must be kept in a temperature below the freezing point. It would be unwise and futile for us to anticipate the incidents of this changed situation, and we can only recommend a thorough study by the Department.

At North Sydney, it was urged upon us by the Directors of the Cape Breton Cold Storage Company that this company be granted a yearly subsidy for a period of five years, pending a development of its business. This Company owns

a large and excellent plant which received the usual subvention under the Cold Storage Act. A very considerable amount of local capital was also invested. The plant is used only for storage for customers, and the company itself is not engaged in any commercial business which contributes patronage. Its operation has not been so far successful financially, and upon its present capital structure it is not likely to be successful. We do not see that any practical purpose would be served by recommending an additional subsidy for a period of years to meet operating deficits. At the end of a period of five years the position of the Company, in the absence of further capital, would probably not be improved. Reorganization of the Company is necessary. But during the period of reorganization there is the possible danger of the plant closing, with resultant embarrassment to those there engaged in the fishing business. In that contingency we recommend financial assistance by the Department, for the meeting of any operating deficit, but upon the condition that reorganization be promptly proceeded with.

(3) *By-Products.*

(a) *Fish Meal.*—A recent development of great value to the fishing industry is the expanding market for fish meal produced from fish waste. The value of white fish meal made from cod, haddock and other ground fish, as a food for cattle, poultry, etc., is now conclusively established and for meal of this grade there is a strong market demand. It is not necessary to discuss here in detail the chemical composition of different fish meals other than to say that white fish meal is rich in protein, and commands the highest market price. While herring meal brings a lower price as a food material, it is also in demand as a fertilizer. At present a fish meal plant is operated at Halifax, N.S. by the National Fish Company; its raw material is the waste of manufactured ground fish and inedible fish taken by steam trawlers. Dogfish are also used to a limited extent. This plant produces at the rate of 2,800 tons annually. Fish meal is also manufactured at Black's Harbour, N.B., by the Connors Brothers Company, Limited; the raw material here is the herring waste incident to the extensive sardine canning business carried on by this company. The operation of this plant is seasonal, but last year it produced about 700 tons of herring fish meal. We were informed that both of these meal plants are profitably operated.

It is, of course, a condition necessary to the successful operation of a fish meal plant, that it be located at a point where there is a plentiful supply of waste fish material, or where the waste may, at a reasonable cost, be assembled in required quantities. We found much interest manifested by many fishermen in the utilization of fish waste for commercial purposes, such as fish meal. There are localities in the Maritime Provinces and Quebec where the manufacture of fish meal might, we think, be carried on with a reasonable hope of financial success; but many places urging the establishment of fish meal plants have not sufficient raw material to warrant the necessary expenditure. Accordingly, careful investigation should precede any final decision to engage in the manufacture of fish meal. The whole subject requires special study by the Department, so that the fullest information on the minimum supply of raw material required to warrant the installation of a plant, the cost of plant and operation, the markets and other requirements, may be available to those who desire it.

A license to construct and operate a herring fish meal plant was granted in 1927 to J. W. Wentworth of Fairhaven, N.B. The issue of the license was opposed on the ground that it might deplete the herring resources of that district. It was proposed to use small herring directly as a raw material in this plant, whereas in the case of the established herring fish meal plant at Black's Harbour, N.B., the meal is made from herring waste incident to the canning of small herring or sardines. We see no objection to the granting of licenses to additional

herring fish meal plants at this place. There seem to be no grounds whatsoever for fearing that the use of herring for the manufacture of fish meal would deplete the herring resources of these waters.

The value of the manufacture of fish waste in other places is indicated by the following statement prepared at our request by Mr. L. D. Wilgress, Canadian Trade Commissioner at Hamburg, Germany.

It is principally in the by-products of the fishing industry that Germany offers the best openings for the disposal of surplus supplies available for export from Canada. This is particularly the case with fish meal, of which large quantities are imported into Germany for the purposes of pig-feeding.

Last year the total imports into Germany of fish meal for fodder and fertilizer purposes amounted to 113,502 metric tons (1 metric ton=2,204 lbs.) of a total value of \$8,921,483. This compares with an import of 81,963 metric tons in 1926. These totals would include whale and other fish meal imported for fertilizer purposes, but the great bulk would be comprised of fish meal for animal feeding.

Norway and Great Britain are the principal sources of supply for the fish meal imported into Germany. Last year the former country supplied 54,776 metric tons and the latter country 30,510 metric tons, while 8,790 metric tons are shown as having come from the United States and 4,260 metric tons from Canada.

An excellent beginning has been made in the introduction of Canadian fish meal to the German market. One company in Nova Scotia is regularly shipping whitefish meal to Hamburg and the quality of their product has produced a favourable impression among the trade. During the past season around 9,000 short tons of pilchard meal were shipped to Germany from British Columbia, this quantity being considerably more than half of the total output of fish meal in that province last year. Full particulars regarding the German market for Canadian fish meal were given in a report published in the *Commercial Intelligence Journal* (Canada) of December 4, 1926.

(b) *Oil*.—The matter of the production and marketing of cod-liver oil appears to be under reasonably proper direction. In 1926 there were 180 places in the Maritime Provinces and Quebec producing cod-liver oil, with a production for that year of 296,182 gallons. In 1925, 26,836 gallons of medicinal cod-liver oil were produced, and in 1926, 94,383 gallons, ninety per cent of which was produced in Nova Scotia. The greater part of the medicinal oil finds a market in the United States where it is further refined. We recommend that the Department place itself in a position to afford the fullest information regarding the most advanced and scientific practices in connection with the production, refining and marketing of cod-liver oils, medicinal oils and other fish oils. There are many places on the Atlantic coast where this by-product might be saved in greater quantities if fishermen were better instructed as to the proper methods for so doing. There is room for further research work in connection with the manufacture of higher grades of medicinal oil, and the uses of cod-liver oil for other than medicinal purposes. There is much interesting information on this subject which is not readily accessible to fishermen, and printed bulletins containing this information should be published and circulated.

The chief countries manufacturing cod-liver oil are Great Britain, Newfoundland and Norway. It is claimed in respect of Newfoundland cod-liver oil, that as cod is there caught largely inshore, not when spawning but when in pursuit of food, the vitamin content of the oil is greater than in the oil of cod caught off-shore. In 1926 Newfoundland produced 5,145 tons of cod-liver oil, the ton measuring 252 wine gallons, and 169,645 gallons of refined cod-liver oil. An interesting statement on fish oils and cod-liver oils is to be found in the Report of the Imperial Economic Committee.

(c) *Pearl Essence*.—A somewhat valuable by-product of the herring fishery in Grand Manan, N.B., is Pearl Essence, manufactured from crystals of guanin found on the scales of the herring. This is the only place in Canada where this product is manufactured. The herring are scaled as they are being placed in the tanks; the scales, separated from the water, are worth from four to ten cents per pound. The scales pass through a more or less secret process

which separates the crystals from them, and these, held in suspension in ammonia, are later converted into pearl essence from which imitation pearls are manufactured. At the present time several United States firms purchase the scales fresh and send them to Eastport, Maine, for manufacture. From this source the fishermen have a revenue, described to the Commission as "several times five thousand dollars."

The history of the use of this by-product is of interest. Up to about five years ago herring were packed without any thought of their scales; at least there was no thought of removing them in bulk. A method was then devised at Eastport, Maine, for taking the scales from the fish and collecting them, and a plant was established for extracting the pearl essence from them. Since then, this industry has grown steadily. The first year, the plant is said to have used 200,000 pounds of scales; this quantity soon increased to 800,000 pounds. In 1926 it dropped back to 500,000 because of a smaller run of sardines. The company has also maintained two fishing boats which visit the principal weirs along the coast, collecting scales in an attempt to secure sufficient to supply the demand. A considerable quantity of scales are secured even from the boats that handle the fish, for in turning over the catches a certain proportion of the scales fall off.

We recommend that the Department investigate the possibilities of the use of this by-product of a by-product. After investigation, if deemed advisable and profitable, information should be made available to fishermen on methods of gathering and disposing of the scales.

(d) *Dogfish*.—We had many representations made to us respecting the damage caused by dogfish which frequent the fishing grounds of the Maritime Provinces during all the summer and early fall months. Quite frequently, they are present in such numbers as to make it impossible to fish cod and haddock with success or profit. Some attempts have been made to use them in fish meal plants, but the oil must be removed before satisfactory fish meal can be produced; this is an expensive process and the supply of dogfish does not continue long enough to make any such enterprise profitable from this source alone. Many fishermen suggested that a bounty should be paid on dogfish, but the expenditure necessary for such a policy can hardly be estimated, and the results would be doubtful. We cannot therefore, recommend this. Scientists have already given some study to the utilization of dogfish for food. Canning has been tried but with little success. Investigation on how best to utilize this fish should be continued by some scientific body.

(3) GENERAL.

(a) *Bounties*.—Many recommendations were made to us by boat fishermen that the bounty paid to them should be on a parity with that paid to vessel fishermen. The payment of the fishing bounty began in 1882, its object being as stated in the Act of Parliament which authorized it: "To aid the development of the Sea Fisheries of Canada and the Encouragement of the Building and Fitting out of Improved Fishing Vessels and the improvement of the condition of the Fishermen." Under that statute, bounties amounting to about \$160,000 are annually paid to vessels of ten tons and up to eighty tons at the rate of one dollar per ton; to boats under ten tons, one dollar; while the amount paid to fishermen on vessels and boats, fishing at least three months each year and taking at least 2,500 pounds of fish, is determined annually, the amount each fisherman receives depending upon the number of claimants who are vessel fishermen, or boat fishermen, respectively. In 1926-27 the total bounties paid to vessel and boat owners and fishermen was \$159,768.10, of which \$83,006.90 was paid to Nova Scotia fishermen, \$16,721 to those of New Brunswick, \$13,221.55

to those of Prince Edward Island and \$46,818.65 to those of Quebec. The Annual Report of the Fisheries Branch of the Department gives by Provinces, the number of vessels, boats and men receiving bounty each year. The amount payable for the year 1927-28 was \$6.60 to each boat fisherman, and \$8 to each vessel fisherman. The total amount paid in 1927-28 was \$99,330, distributed to 15,050 boat fishermen, and 3,702 vessel fishermen.

The suggestion was frequently made to us that the bounty should be paid only to residents of Canada, and not to non-residents who fish in Canadian fishing vessels during the fishing season and then return to their homes. This suggestion does not appear to us to be sound. Last year about five hundred fishermen from Newfoundland fished in Lunenburg fishing vessels, and to pay them the bounty seems quite within the spirit and purpose of the Act. They were necessary to the successful operation of the fishing fleet and to "aid the development of the Sea Fisheries of Canada." We are of the opinion, however, that the objection to the payment of bounty to fishermen engaged in the shore fisheries, but who are not citizens of Canada, is valid, and we recommend that the bounty to boat fishermen be henceforth paid only to fishermen who are citizens of Canada.

The amount of bounty paid annually to boat fishermen and to vessel fishermen is determined each year by the Governor in Council. The present basis and the method of distribution are on the whole satisfactory; the flexibility of the powers of the Governor in Council has distinct advantages and we are unable to recommend any change in the present system.

(b) *Sick and Distressed Mariners' Fund.*—It was pointed out to us that benefit would accrue to fishermen who fish in boats of less than ten tons, if they were permitted to avail themselves of the provisions of the "Sick and Distressed Mariners' Fund." The Canada Shipping Act makes compulsory the registration of all vessels exceeding ten tons, but the Act does not prevent the registration of a boat or vessel of less than ten tons. The Sick and Distressed Mariners' Act, section 384, provides that the person in command of any registered fishing vessel may pay a duty of two cents for each registered ton of such fishing vessel, on its first voyage in any year, and thereafter before each subsequent voyage; but such payments are not to exceed three in any one year, and in no case shall the payments be less than \$2 in any year. If these payments are made, the crew of the registered vessel or boat automatically come under the provisions of the Act and are entitled to the medical attention therein provided for. It is apparent that these facts are not generally known.

(c) *Workmen's Compensation Act.*—Representations were made to us in respect of a situation which had arisen concerning the bank fishing vessels of Nova Scotia, and the matter of compensation to the fishermen of these vessels for injuries suffered in the course of their employment. The Lunenburg bank fishing vessels are principally concerned in this question.

In 1915 the Legislature of the Province of Nova Scotia enacted a Workmen's Compensation Act, the important features of which are similar to all legislation of this kind. In 1919 the provisions of the Act were extended to include deep sea fishermen, and after January 1st, 1920, the owners of fishing vessels became liable to pay compensation for injuries received by fishermen in the course of their employment. The owners of vessels insured against this liability by paying to the Workmen's Compensation Board of Nova Scotia, an amount made up by an assessment upon the total wage roll of a vessel, at first fixed at the rate of three per cent. As the fishermen of the Lunenburg fishing vessels are sharesmen in the catch, the Act arbitrarily declared that a fisherman

should be deemed to earn \$65 per month. The rate of three per cent was found to be too low, and it was subsequently raised to five per cent for the summer season, and ten per cent for the winter months. Owing to the loss in 1926 of two vessels with their crews numbering fifty men, the Board, at the beginning of 1927, gave notice that the rate for that year would be raised to ten per cent for the summer months, and to a still higher rate for the winter months; but the Legislature of Nova Scotia by statute fixed the rate for 1927 at five per cent, and appointed a Commissioner to determine whether or not the Board would be justified in increasing that rate in subsequent years. Under the five per cent rate, 87 vessels of the Lunenburg fleet, in 1926, paid \$33,787.75 to the Board, or an average assessment of \$388.36 on each vessel. The proposal to double the rate would mean, in the average assessment on each vessel, a corresponding increase which was considered to be beyond the capacity of the industry to bear. In 1927 the situation was further aggravated by the unfortunate loss of four vessels with their entire crews. In 1928 the Board notified the owners of Lunenburg vessels that the rate for that year would be approximately twenty per cent.

That was the situation when the Commission met at Lunenburg. Subsequently, arrangements were made with Lloyds to carry the risk at a premium of 7.15 per cent of the payroll, which, we are advised, would amount on the average to about \$550 per vessel. We are told that the limitation of liability in the loss of any one vessel and crew is \$50,000. The Legislature of Nova Scotia has, we are informed, enacted legislation fixing the rate to be paid by the vessel owner at five per cent of the pay roll, and authorizing the payment from the Provincial Treasury of the difference between the amount of this assessment and the premium charged by Lloyds. This difference, it is estimated, will this year be about \$12,000.

We were asked, on behalf of the Government of Nova Scotia, to recommend that after this year the Federal Government pay annually the difference between the five per cent assessment and the premium charged from time to time for carrying the risk. An important principle is involved in the suggestion that the Federal Government assume a liability imposed by a provincial Workmen's Compensation Act for the protection of the workmen in one particular branch of an industry, and in one Province. Workmen's Compensation Acts are wholly of provincial concern, and we know of no instance where the Federal Government has submitted to assessments under such Acts, unless it was for the protection of its own employees resident in any Province. The granting by the Federal Government of the request made here for the benefit of one section of an industry, and in one Province only, would inevitably lead to similar requests from similar or other industries in other Provinces.

The record of loss in 1926 and 1927 was not typical of the long history of the Lunenburg bank fishing fleet. The liability assumed by the Government of Nova Scotia for the present year cannot be said to be burdensome, particularly as it relates to an industry so important to the Province, and as it meets in part obligations imposed upon employers by provincial legislation. In the circumstances we cannot therefore recommend that the Federal Government should assume the suggested liability. If future events should justify the presentation of a similar request because of unusual circumstances, the matter may be considered in the light of the particular circumstances, and in consultation with other Provinces.

V

TRANSPORTATION

1. SUBSIDIZED STEAMSHIP SERVICE

The necessity for new or improved subsidized steamship services was placed before us in many localities, particularly in eastern Nova Scotia. Certain sections of the eastern coast of Cape Breton Island, where the fisheries constitute the principal occupation of the residents, have no railway communication; they are completely isolated in the winter season, and even in summer the steamship service is far from adequate. Such sections should be provided with satisfactory transportation facilities during the season of open navigation. The residents of the northern part of Victoria County, N.S., asked that a steamship service be established between there and Halifax, where their fish products are chiefly marketed and where their supplies for fishing are largely purchased. We recommend that such service be assisted by subsidy to such an extent as will ensure its operation at regular periods during the season of open navigation. A like service was once carried on, but in recent years it has been limited to certain spring and fall trips. Sections of the coast of Richmond and Cape Breton Counties, between Louisburg and St. Peter's, where fishing is extensively carried on, are without railway facilities. There, the sailings of the present subsidized steamship services are said to be insufficient to meet the reasonable demands of these communities. Any improvement in the present service might require changes in other connecting services and if the residents of this section can reasonably show that the present steamship service should be extended, and such extension requires additional subsidy, we recommend that assistance be granted.

The important fishing village of L'Ardoise in Richmond County is without direct rail connection nearer than St. Peter's and also without steamship connection with either St. Peter's or Halifax. Fish products destined to Halifax, and supplies coming from Halifax, are transported overland to and from St. Peter's at an additional charge of from fifteen to twenty cents per cwt., a serious handicap to the fishermen of that place. It was suggested to us that this difficulty might be overcome by making a motor transport service between St. Peter's and L'Ardoise an inclusive part of the present subsidized steamship service between St. Peter's and Halifax. Another suggestion was the subsidizing of a direct auxiliary schooner service to and from Halifax during the navigation season. We recommend that assistance be given to whichever form of these suggested services may be found after consideration to suit the needs of this community.

We were told that a steamship service along the coast of Guysboro County, N.S., to Boston or Portland, U.S.A., should be established and assisted. We were not, however, given sufficient facts to justify the forming of any definite conclusion on the soundness of such a project. If application is made for assistance for such a service, and if it is shown that there is sufficient traffic to warrant its establishment, the requisite support should be given.

It was recommended to us that the steamship service, between Mulgrave and Cheticamp, N.S., now subsidized by the Federal Government, should be kept in operation until the end of the navigation season, and not merely for a stated number of trips during the season as provided by the existing contract. We were told that upon the ending of this service last year there was an immediate decline in the prices paid to fishermen for their products. We think that this request is fair and reasonable and that it should be acceded to. It should at least be thoroughly investigated.

The Grand Manan steamship service was brought to our attention at the hearing held at St. Stephen, N.B. The need for an adequate steamship service from this island to the mainland is of course obvious. There is a population of

3,000 people on Grand Manan, Campobello, and Deer Islands. The fishery here carried on is extensive and is practically the sole industry. Various suggestions were made to us as to how the service might or should be improved. We recommend that an enquiry into this matter be directed by the Department of Trade and Commerce and that a revised and improved service be established to meet adequately the reasonable demands of the residents of these Islands.

2. RAILWAYS

In several places our attention was called to the alleged need of railway extension to serve certain fishing communities situated far from convenient lines of communication. Many of these localities are served by steamship connection during the season of open navigation but during the winter months some of them are almost completely isolated. Railway service in such places would aid greatly in the development of the fishing industry, by providing facilities for marketing and for the more rapid obtaining of supplies. It would also be of general advantage to the communities interested.

We were unable to make any investigation into the feasibility of the proposals made to us, and we can only here bring them to the notice of the proper Department of Government. Among the projects suggested to us were the extension of the Inverness Railway to Cheticamp; the continuation of the railway line from St. Peter's to Louisbourg; the continuation of a branch line from Lunenburg to Riverport on the LaHave River; the construction of the Guysborough railway from Sunnybrae, Pictou County, to Guysborough or Canso; and the extension of the railway line from Tracadie to Newcastle.

3. FREIGHT AND EXPRESS RATES

We were informed by many shippers who appeared before us that the railway freight and express rates on fish are considered, on the whole, fair and reasonable, and that the railway facilities for handling the product are in general satisfactory. In some places it was stated that the rate on live lobsters is considered too high. But this complaint fails to take into consideration the fact that live lobsters are very difficult to transport and must be handled with greater care and attention than that required by ordinary fish. The mortality in transit, even with the most careful handling, amounts to as as high as 15 per cent, hence the actual costs of transportation are greater. Questions of freight and express rates may always be brought to the attention of the railway authorities for consideration and adjustment.

VI

TARIFF

1. NEWFOUNDLAND DUTIES

Section 8 of the Canadian Customs Tariff, 1907 provides, that fish and other products of the fisheries of Newfoundland may be imported into Canada free of customs duty until otherwise determined by the Governor in Council. In several places, more especially in Nova Scotia, we were asked to recommend that this provision of the Canadian Customs Tariff be amended, so as to make subject to customs duties, Newfoundland fish entering Canada. This request had reference particularly to the importation of dried fish and fresh fish.

For the eight months ending November 30, 1927, 5,692,699 pounds of dried cod, haddock, etc. were imported into Canada from Newfoundland, valued at \$273,440; 2,582,848 pounds of cod, haddock and pollock, wet, salted or pickled, valued at \$85,722; 2,981,550 pounds of pickled herring valued at \$50,277. Of all fish, salted, dried or smoked, a total of 12,444,634 pounds was imported during

this period from Newfoundland, valued at \$476,118. For the same period there was imported of preserved or canned fish, 13,922,380 pounds valued at \$627,207, and of fish, fresh and frozen, 1,449,571 pounds valued at \$145,460. Fresh herring and fresh salmon constituted about seventy-five per cent of the total importation of fish, fresh and frozen.

At Halifax and Lunenburg, N.S., in 1927, a considerable quantity of dried codfish was imported from Newfoundland by fish merchants who graded, dried and packed it for export. At the time of our hearing at Lunenburg a large proportion of the fish landed by the Lunenburg fishing fleet had not been marketed; consequently the importation of Newfoundland fish was the cause of much adverse comment, and was largely the reason for the demand for a duty upon such fish. The merchant importer contended that as Newfoundland fish entering Canada was not for consumption in Canadian markets, but was exported to foreign markets which are common to Nova Scotia and Newfoundland, little if any benefit would be gained by preventing such importations. It was pointed out in addition that in such prevention there would be a pecuniary loss to those engaged in the export trade. It was also contended by the Nova Scotia exporters of dried fish that they could have purchased the same fish in Newfoundland, and prepared them there for the same market to which they were exported from Lunenburg; and that even if a duty were now imposed it would not necessarily prevent importation for re-export, because the general provisions of the tariff entitle an importer to a drawback equal to 99 per cent of the duty paid, when the article is exported.

The Customs Tariff of Newfoundland provides that in addition to the normal Customs duties on certain goods, such as flour, hay, vegetables, etc. there may be levied additional tariff duties when such goods are imported from countries in which duties are levied upon fish or fish products from Newfoundland. It is therefore evident that the imposition of customs duties on Newfoundland fish, might increase the Newfoundland tariff upon certain Canadian products, which now enter Newfoundland in substantial quantities. It would doubtless raise important questions affecting many interests, and before departing from a tariff policy of long standing, careful consideration and enquiry would be necessary.

2. GENERAL

Representations were made to us on the necessity for certain tariff readjustments to suit more fairly the needs of the fishing industry. The tariff on implements of production was alleged to be too high,—particularly on implements not manufactured in Canada. The tariff on sardines is specific determined many years ago, when the price of sardines was very low compared with present prices. It was suggested that it should be changed to an ad valorem duty. In sealing sardine tins, it is necessary to use a rubber gasket which is not manufactured in Canada, and which, because of patent rights, cannot be manufactured by the packer who manufactures cans. We were asked to recommend that the tariff on these gaskets be removed. The price of gasoline, used by fishermen is excessively high in certain parts. It is alleged that if the duty and the sales tax were taken off, lower prices would result. The duty and the tax fall very heavily on the fishing population.

We do not feel ourselves competent to enter into a discussion of these questions. We recommend that all these requests, affecting the welfare of the fishermen or dealers engaged in developing the fisheries, be referred to the Tariff Board for enquiry. Repeated suggestions were made to us with reference to the desirability of continuing efforts to secure free entry for Maritime Provinces fish into United States markets. This question is, however, beyond the terms of our reference. It is a matter of long standing negotiations which, we are informed, have not been abandoned.

VII

MODUS VIVENDI

One of the matters referred to us for inquiry is whether or not the so-called *modus vivendi* privileges for many years accorded to United States fishing vessels in Canadian ports, but discontinued since 1924, should be restored wholly or in part. In order that this long discussed question may be clearly understood, it is perhaps desirable to state somewhat fully the facts concerning its origin and later history. Always associated with this subject, it will be found, was the question of reciprocal port privileges, and reciprocal tariff arrangements on fish products, between the United States and Canada.

The question as to what rights should be granted or accorded to United States fishermen and fishing vessels in the territorial waters of the British Dominions in North America, first arose during the peace negotiations following the American Revolutionary War. The third article of the Treaty of Peace, 1783, dealt with this, and the fishing rights therein granted to United States fishermen and fishing vessels within the territory and territorial waters of what is now Canada and Newfoundland, provoked differences of opinion between the United States and British North America. It was later claimed by Great Britain that the stipulations of the Treaty on this point, which need not be textually quoted, were terminated by the war of 1812; but differences of opinion upon the subject were eventually composed by an agreement between Great Britain and the United States to negotiate terms of settlement upon this and other pending disagreements. This agreement resulted in the Treaty of 1818. Article 1 of this Treaty is as follows:—

Whereas differences have arisen respecting the liberty claimed by the United States for the inhabitants thereof, to take, dry and cure Fish on Certain Coasts, Bays, Harbours and Creeks of His Britannic Majesty's Dominions in America, it is agreed between the High Contracting Parties, that the inhabitants of the said United States shall have forever in common with the Subjects of His Britannic Majesty, the liberty to take Fish of every kind on that part of the Southern Coast of Newfoundland which extends from Cape Ray to the Rameau Islands, on the Western and Northern Coast of Newfoundland, from the said Cape Ray to the Quorpon Islands, on the shores of the Magdalen Islands, and also on the Coasts, Bays, Harbours and Creeks from Mount Joly on the Southern Coast of Labrador, to and through the Straits of Belle Isle and thence Northwardly indefinitely along the Coast, without prejudice, however, to any of the exclusive Rights of the Hudson Bay Company; and that the American Fishermen shall also have liberty forever, to dry and cure Fish in any of the unsettled Bays, Harbours and Creeks of the Southern part of the Coast of Newfoundland hereabove described, and of the Coast of Labrador; but so soon as the same, or any Portion thereof, shall be settled, it shall not be lawful for the said Fishermen to dry or cure Fish at such Portion so settled, without previous agreement for such purpose with the inhabitants, Proprietors, or Possessors of the grounds.—And the United States hereby renounce forever, any Liberty heretofore enjoyed or claimed by the inhabitants thereof, to take, dry or cure fish on, or within three marine Miles of any of the Coasts, Bays, Creeks or Harbours of His Britannic Majesty's Dominions in America not included within the above-mentioned limits; provided, however, that the American Fishermen shall be admitted to enter such Bays or Harbours for the purpose of Shelter and of repairing Damages therein, of purchasing Wood, and obtaining Water, and for no other purpose whatever. But they shall be under such Restrictions as may be necessary to prevent their taking, drying or curing fish therein, or in any other manner whatever abusing the Privileges hereby reserved to them.

This provision did not, however, entirely eliminate the disagreements between the two countries, as each placed a different interpretation upon some of its important features.

With the hope of settling the fisheries question and other matters in dispute, an agreement to negotiate another treaty was entered into, and from it followed the Reciprocity Treaty of 1854, under which fish and fish products of each country were admitted free of duty into the other, and reciprocal fishing privileges

were authorized in certain territorial waters of each country. This treaty was terminated in 1866. Following its termination, and in anticipation of reaching a new agreement, Canada continued for a time to grant the privileges of the treaty to United States fishermen, by issuing licenses to their fishing vessels on payment of a fee of fifty cents per registered ton. This fee was raised to one dollar per ton in 1867, and the following year to two dollars per ton, but as the number of vessels taking such licenses fell from 365 in 1866, to 35 in 1869, the licenses were then withdrawn, and in 1870 the provisions of the Treaty of 1818 again became effective. A certain fisheries protective service had in the meantime been created and seizures of United States fishing vessels ensued with consequent irritations; however, the two countries again reached an agreement, and in 1871 negotiated the Treaty of Washington, which became effective in 1873. This Treaty practically renewed the fisheries provisions of the Reciprocity Treaty of 1854, and continued in force until 1885 when it was terminated; during its currency Article 1 of the Treaty of 1818 was suspended, but on its termination the provisions of this Article were reverted to.

In the enforcement of Article 1, differences again arose as to its proper interpretation; and with a view to removing the source of any misunderstanding between Great Britain and the United States, in 1888 the second Treaty of Washington was negotiated between the two countries, a Canadian Minister of the Crown, being one of the plenipotentiaries who negotiated the Treaty. This treaty failed of ratification by the Senate of the United States and therefore never became effective between the two countries. By the terms of this draft Treaty certain privileges were reserved and secured to United States fishing vessels in the territorial waters and ports of Canada and Newfoundland, and the same privileges were reserved and secured to Canadian and Newfoundland fishing vessels on the Atlantic coast of the United States. Article XV of that Treaty is as follows:—

Whenever the United States shall remove the duty from fish-oil, whale-oil, seal-oil, and fish of all kinds (except fish preserved in oil), being the produce of fisheries carried on by the fishermen of Canada and of Newfoundland, including Labrador, as well as from the usual and necessary casks, barrels, kegs, cans and other usual and necessary coverings containing the products above mentioned, the like products, being the produce of fisheries carried on by the fishermen of the United States, as well as the usual and necessary coverings of the same, as above described, shall be admitted free of duty into the Dominion of Canada and Newfoundland.

And upon such removal of duties, and while the aforesaid articles are allowed to be brought into the United States by British subjects, without duty being reimposed thereon, the privilege of entering the ports, bays and harbours of the aforesaid coasts of Canada and of Newfoundland shall be accorded to United States fishing vessels by annual licenses, free of charge, for the following purposes, namely:

1. The purchase of provisions, bait, ice, seines, lines and all other supplies and outfits;
2. Transhipment of catch, for transport by any means of conveyance;
3. Shipping of crews.

The like privileges shall be continued or given to fishing vessels of Canada and of Newfoundland on the Atlantic coasts of the United States.

The Treaty of Washington was negotiated in February, 1888. The British plenipotentiaries realized that complications might ensue, if,—pending its ratification by the Senate of the United States, by the Parliament of Canada and the Legislature of Newfoundland,—the provisions of the Treaty of 1818 were enforced during the approaching fishing season. They offered to make a temporary arrangement to bridge over this period, and a protocol to the Treaty was signed by the British plenipotentiaries. The protocol is in part as follows:—

Under these circumstances, and with the further object of affording evidence of their anxious desire to promote good feeling and to remove all possible subjects of controversy, the British Plenipotentiaries are ready to make the following temporary arrangement for a period not exceeding two years, in order to afford a *modus vivendi* pending the ratification of the treaty.

1. For a period not exceeding two years from the present date, the privilege of entering the bays and harbours of the Atlantic coasts of Canada and of Newfoundland shall be granted to United States fishing vessels by annual licenses at a fee of \$1.50 per ton—for the following purposes:—

The purchase of bait, ice, seines, lines and all other supplies and outfits;
Transhipment of catch and shipping of crews.

2. If during the continuance of this arrangement the United States should remove the duties on fish, fish-oil, whale and seal-oil (and their coverings, packages, etc.) the said licenses shall be issued free of charge.

3. United States fishing vessels entering the bays and harbours of the Atlantic coasts of Canada or of Newfoundland for any of the four purposes mentioned in Article 1 of the Convention of October 20, 1818, and not remaining therein more than twenty-four hours, shall not be required to enter or clear at the Custom house, providing that they do not communicate with the shore.

4. Forfeiture to be exacted only for the offences of fishing or preparing to fish in territorial waters.

5. This arrangement to take effect as soon as the necessary measures can be completed by the colonial authorities.

It was from this Treaty that the so-called *modus vivendi* question arose. The Treaty itself failed of ratification by the United States Senate.

In the expectation that some arrangement would be reached, such as the unratified Treaty proposed, the Canadian Parliament by statute continued the *modus vivendi* license during 1890, and again by statute during 1891. In 1892 authority was conferred by statute upon the Governor in Council to renew these licenses from year to year, with the result that licenses were granted to United States fishing vessels until 1918. In that year there was entered into by the United States and Canada another reciprocal arrangement which will be later explained. This arrangement made it unnecessary to issue the customary *modus vivendi* licenses.

Meanwhile, a similar question was arising on the Pacific coast in connection with the halibut fisheries then developing there. In the early days of that fishery, and even down to 1918, the controversy in British Columbia was largely between United States halibut fishing interests operating out of Canadian ports, and those operating out of the United States ports. In 1897, leave was granted by the Government of Canada to halibut fishing vessels of the United States for a period of six months to land their catches in British Columbia ports for transshipment. This privilege was continued from year to year thereafter with slight modifications, until it was succeeded in 1918 by the arrangement mentioned in the last paragraph. In the meantime, under the Underwood Tariff, so called, the duties on fresh and frozen fish going to the United States from Canada were removed.

In 1914, in a memorandum addressed to the Government of Great Britain, the Government of the United States inquired if it would concede to United States fishing vessels the privilege of entering any of the Atlantic ports of Canada and Newfoundland in sailing vessels with or without auxiliary motor power, to purchase fuel, bait, ice, food, equipment, etc., to repair fishing gear, to tranship their catch, and to ship crews. The memorandum pointed out that previous treaties between the two countries authorized these privileges when the markets of the United States were open to Canadian fish products, that under the then existing customs tariff of the United States, free entry of fresh and frozen fish from these countries was permitted, and that the privileges requested might therefore be accorded.

At that time Canadian fishing vessels were not allowed to enter United States ports direct from the fishing grounds, but were obliged to return to a Canadian port to tranship their fish by a merchant ship or by rail; they were not permitted to clear from a United States port direct to the fishing grounds, but were required to clear for a foreign port. Hence, it was considered that this

interpretation of the navigation laws of the United States largely nullified the value of the new tariff rates to Canadian fishing vessels on the Atlantic coast. In view of the privileges then granted to United States fishing vessels under the *modus vivendi* licenses, the Canadian Government inquired if these navigation restrictions might not be removed. The United States Government, however, took the position that under its laws no such arrangement was authorized; and that the effect of such an arrangement would put Canadian vessels on a parity with their own in United States ports, while United States fishing vessels would still be required to request and procure a license to enter Canadian ports. In May 1917, the Government of Canada replied, proposing a settlement of the difficulties on both coasts, on the following basis:—

(a) That the *Modus Vivendi* privileges be extended to all the United States fishing vessels and applied to both coasts, and the fee reduced to the nominal sum of one dollar and their renewal not to be made conditional on an Order in Council, but be a part of the proposed arrangement.

(b) That United States fishing vessels on both coasts be allowed to sell their catches in Canadian ports for Canadian markets on payment of the duty or to sell in bond.

(c) That Canadian vessels be allowed to purchase bait in United States ports or waters on equal terms with United States fishing vessels.

(d) That Canadian fishing vessels be allowed to take their catches to United States ports and sell them there subject to duty, if any.

(e) That fishing vessels of either country be given clearances to the fisheries from ports in the other.

(f) That the United States Government prevent their lobster well smacks from fishing outside our territorial waters during the close season there.

The United States, upon consideration of these proposals, suggested the appointment of an International Commission. A Commission was ultimately set up, and its work was completed in September 1918. Following the early sittings of that Commission and upon the recommendations of the representatives of each country to their respective Governments, authority was given in each country under the special war legislation then effective in both countries, for the granting of full port privileges in either country to the vessels of the other, the sale of their catches, the purchase of bait and all other supplies, and the right of clearance for the high seas. The understanding was, we are informed, that these arrangements would stand until action could be taken on the report and recommendations of the Commission. This is the arrangement of 1918 referred to in preceding paragraphs. The Commission in due course submitted a unanimous report to the two Governments, in part as follows:—

In the light of these facts your commissioners feel constrained to recommend that the Canadian duty on fresh and fresh frozen fish not including shellfish be removed and with a view to assuring stability in the industry that the two countries enter into an agreement by which such fish will be admitted customs duty free from either country into the other, and that such arrangement remain in force for fifteen years, and thereafter until two years after the date, when either party thereto shall give notice to the other of its wish to terminate the same.

They, therefore, recommend that Article 1 of the Treaty of the 20th October, 1818, be amended so as to make available in either country to the fishing vessels of the other, the privileges covered by the instructions of the United States Secretary of Commerce to collectors of customs of that country, dated February 21, 1918, and by the Canadian Order in Council dated March 8, 1918, in substance as follows:—

1. That the fishing vessels of either country may enter, from the high seas, any port of the other, and clear from such port back to the high seas and the fishing grounds.

2. That the fishing vessels of either country may dispose of their catches and purchase bait, ice, nets, lines, coal, oil, provisions, and all other supplies and outfits in the ports of either country.

3. That the repairing of fishing implements in the ports of either country be allowed to the vessels of the other country.

4. That the fishing vessels of either country may dress, salt, and otherwise prepare their catches on board such vessels within the territorial waters of the other country.

5. That the fishing vessels of either country may ship their crews and tranship their catches in the ports of the other country.

6. That the fishermen of either country may sell their catches in the ports of the other country, subject to local tariff, if any.

With the exception of the removal of the Canadian duty on fresh and frozen fish, the recommendations of the Commission were approved by the Canadian Government by Order in Council on March 11th, 1919. This exception was apparently taken on the ground that the matter of customs duties between the two countries was not included in the matters referred to the Commission, but the Canadian Government suggested that this question should be the subject of independent negotiations. Soon afterwards, however, the Canadian Government approved of the entire recommendations of the International Commission, and authorized the commencement of negotiations for a treaty in conformity therewith. The preparation of a treaty was begun in September 1919 at Washington, and a draft treaty was completed in the following October. The treaty was not then signed because, it is understood, the illness of the President of the United States made it impossible to authorize the appointment of a representative of that country to execute the treaty.

In June 1921, the United States Government advised the Canadian Government through the usual channels that the authority under which the privileges granted in 1918 to Canadian fishing vessels in United States ports had ceased with the lapse of its war legislation, and that such privileges would be discontinued on July 15, 1921. Canada, however, continued until 1923 to accord to United States fishing vessels the privileges granted under the arrangement of 1918, notwithstanding that its war legislation under which this arrangement was made had in the meantime been repealed.

Negotiations were however continued between Canada and the United States. In 1922 the former suggested that an arrangement be made for the protection of the halibut fisheries of the Fraser River and generally on the Pacific Coast, and that negotiations for an international agreement on this particular question, and all other outstanding fishery questions, be taken up anew.

Meanwhile it would appear that there was a development of opinion on the Canadian Atlantic coast against the continuance of the *modus vivendi* privileges to United States vessels, unless similar privileges were granted by the United States to Canadian fishing vessels, together with a more favourable tariff on Canadian fish products. In November, 1923, it was determined by an Order of the Governor General in Council that such *modus vivendi* licenses would not be continued after the end of that year, and the United States Government was so notified. Since 1924, accordingly, the *modus vivendi* privileges have not been granted to United States fishing vessels.

Meanwhile, on the Pacific coast, privileges similar to the *modus vivendi* continued to be granted to United States halibut fishing vessels. The United States tariff legislation of 1922 placed a duty of two cents per pound on halibut entering the United States, which concededly was the largest market for Canadian halibut. Canadian halibut fishing vessels were thus put at a disadvantage in competing with United States halibut fishing vessels, although the latter continued to enjoy the advantage of using Canadian ports on the Pacific coast. In these circumstances Canada suggested a conference between representatives of the two Governments to consider questions relating to the fisheries of the Pacific and the Atlantic coasts.

The United States Government agreed to this suggestion, but later put forward the proposal that inasmuch as the United States Tariff Commission was conducting an investigation into the question as to whether there should be any variation of the duty upon imported halibut, the suggested conference would be more effective if held after the report of that Commission was completed. A report was made by the Tariff Commission, we are informed, in July, 1925. A conference was held at Washington in February, 1926, when this matter was again discussed between representatives of the two countries. No definite

conclusions were reached, but it was understood, we are informed, that the Canadian Government would later be communicated with thereon. The negotiations have not therefore been discontinued.

Many opinions were expressed to us in support of a return to the practice of renewing the *modus vivendi* privileges to United States vessels. This view was very generally expressed by shore fishermen upon the ground that it would enable them at times to sell bait to United States fishing vessels, the substantial value of which to fishermen was, however, doubted by many. Others concurred in this view but with limitations. Some urged that United States fishing vessels be not allowed to land and tranship fish; others, that they be not permitted to ship crews; others, that only bait might be purchased; while many others contended that the privileges should be granted only on the condition that the United States extend to Canadian fishing vessels similar privileges in its ports, and more favourable tariff concessions for Canadian fish entering United States markets. Some expressed the opinion that for the present the matter should be left as it is, and that sometime in the future it should become, along with other fishery matters, the subject of negotiations with the United States. In the important fishing ports of Lunenburg and Lockeport, opinion seemed against a return to the *modus vivendi* without reciprocal concessions of some nature.

In plain terms, the opponents of the restoration of the *modus vivendi* say that Canada should not aid United States fishing vessels in their production of fish, which is in competition with Canadian fish, by granting certain privileges under *modus vivendi* licenses, unless the United States is willing to grant the same privileges to Canadian fishermen, or a more favourable tariff on fish products. Many informally presented the view that this question should be settled in respect of the Atlantic and Pacific coasts in the same manner and at the same time; that a uniform national policy is desirable upon this point; and that on this basis alone the matter should be made the subject of negotiations with the United States.

From what has been said, it is apparent that the *modus vivendi* had its origin in the proposed Treaty of Washington in 1888; that it was then regarded as a temporary measure pending the ratification of the Treaty by the countries who were parties to it; that it was not a matter of fixed policy if the Treaty never became effective; and that the *modus vivendi* privileges have usually constituted a provision of every treaty or arrangement negotiated with the United States by or on behalf of Canada in respect to fishery matters, such provision being always reciprocal. In the draft of the treaty negotiated in October, 1919, but not yet signed, provision was made for reciprocal arrangements in the following matters, separate and apart from any reference to the question of tariff:—

- (a) Purchasing bait, ice, nets, lines, coal, oil, provisions, and all other supplies and outfits used by fishing vessels whether the same are of a like character to those named herein or not;
- (b) Repairing fishing implements;
- (c) Shipping crews;
- (d) Transshipping their catches, and where transhipped for destination within the Dominion of Canada, shipping same in bond.
- (e) Landing and/or selling their catches in the United States, subject to the payment of customs duties thereon, if any;
- (f) Entering and clearing for the high seas and the high seas fisheries, without payment of any tonnage dues or duties and/or other charges specifically imposed on vessels entering from and clearing for foreign ports, and
- (g) Dressing, salting and otherwise preparing their catches on board ship in port and in the territorial waters of the United States; and on land, if previous agreement for such purpose is made with the proprietors or possessors of the ground or other property used, subject to local laws and/or regulations.

While this treaty has not been signed, we understand that negotiations to that end have not yet been abandoned.

We perhaps should observe again, to make it clear, that Canadian fishing vessels, as such, are not entitled to any privileges in the ports of the United States. They cannot enter United States ports directly from the fishing grounds and land catches of fish even on payment of duties. They must return to a Canadian port and there transfer their fish to a trading or commercial ship, or to the railway, for shipment to the United States. A Canadian fishing vessel is not granted a clearance from a United States port direct to the fishing grounds, nor can it there ship crews or purchase supplies of any kind.

Upon a review of the opinions expressed to us, and upon a consideration of the reasons given, we do not see grounds for recommending any modifications of the present policy. Further, negotiations between the two countries upon the subject are still pending, and we see no reason for intervening with any suggestion in anticipation of their results.

VIII

THE HALIFAX AWARD

By Article XVIII of the Treaty of Washington, 1871, inhabitants of the United States were permitted for the term of years mentioned in Article XXXIII of the Treaty, to take fish of every kind, except shellfish, on the sea coast and shores and in the bays, harbours and creeks of the Provinces of Quebec, Nova Scotia, New Brunswick and Prince Edward Island, without being restricted to any distance from the shore. They were also permitted to land upon the said coasts and shores, and also upon the Magdalen Islands, for the purposes of drying their nets and curing their fish. This privilege applied solely to the sea fisheries; salmon and shad fisheries and all other fisheries in rivers and in the mouths of rivers were reserved exclusively for British fishermen. Under Articles XXII and XXIII of the Treaty, Commissioners were appointed to determine the amount of any compensation which in their opinion ought to be paid by the Government of the United States to the Government of Great Britain, in return for the privileges accorded to the citizens of the United States, under Article XVIII of the Treaty. On November 23rd, 1877, the Commission awarded the sum of Five Million Five Hundred Thousand Dollars to be paid by the Government of the United States to the Government of Great Britain. This amount was not paid until the month of January, 1879. Later the British Government paid One Million Dollars of the award to the Government of Newfoundland, and Four Million Five Hundred Thousand Dollars to the Government of Canada. The amount paid to Canada went to the Treasury as Consolidated Revenue. We are informed by officers of the Department that expenditures incurred by the Government of Canada in connection with the work of the Commission, amounted to about Five Hundred Thousand Dollars, and that the amount of Four Million Dollars has always been recognized as the net amount received by Canada.

Subsequent to the payment to the Government of Canada of its proportion of the award, the claim was made on behalf of the fishermen of the Atlantic Coast that this sum should not be regarded as a part of Consolidated Revenue, but that the entire award or at least the annual interest on it, should be specifically devoted to the developing of the Atlantic Coast fisheries, and to the improving of the condition of the fishermen. In 1882, the Parliament of Canada made provision for an annual grant of One Hundred and Fifty Thousand Dollars to aid in the development of the deep sea fisheries of Canada and in

the encouragement of the building and fitting out of improved fishing vessels. Later, this legislation was amended so as to provide an annual grant of One Hundred and Sixty Thousand Dollars, and from this grant the annual fishing bounties have since been paid to certain vessels, boats and fishermen. The suggestion was made that the interest for three years upon the principal of the Canadian portion of the award, that is, for the years from 1879 to 1881 inclusive, had never been appropriated for any of the purposes mentioned in the Deep Sea Fisheries Act, or for any similar purposes, and that the interest for this period, together with interest thereon, should now be appropriated by Parliament and devoted to special uses in the interest of the Atlantic coast fisheries and fishermen.

It is regrettable that the legislation empowering the Governor-in-Council to authorize an annual grant of \$160,000 does not in specific terms state that this appropriation is for the benefit of the sea fisheries of Canada on the Atlantic coast. Since 1882 the grant has been distributed in the form of bounties to fishermen and to certain boat and vessel owners in Quebec and the Maritime Provinces. From the House of Commons Debates of 1882, when the resolution, upon which was founded the legislation of 1882, was passed, it is plain that this annual grant was regarded as the interest upon the amount of the Halifax award. We should not think it too late to amend the Deep Sea Fisheries Act so as to make it clear that the grant is applicable only to the Atlantic coast fisheries, and we think that such amendment might avoid controversy in the future.

Conceding that the annual grant paid since 1882 was intended to represent the interest upon the Halifax Award, it would seem that the interest for the three years 1879, 1880, and 1881 might with fairness be appropriated for disbursement in the interest of the fisheries and fishermen of the Atlantic coast. Apparently, at the time of the award it was contended by the Maritime Provinces and Quebec that the principal sum or the annual interest thereon, should be applied to the development of their coast fisheries. Considering the grounds upon which the award was paid, the request that the three years unpaid interest be appropriated by Parliament to be applied to useful purposes in connection with the Atlantic fisheries or fishermen appears to us to be fair and equitable, and we recommend that this amount be so appropriated and applied. We recommend, however, that it be not applied to any of the purposes mentioned in the Deep Sea Fisheries Act, that is for bounties to boats, vessels and fishermen, but that it be specially devoted to such productive uses as assistance in the construction of brine freezing plants, fish meal plants, driers, bait and cold storage plants for organized groups of fishermen, or others engaged in any phase of the industry, upon proper terms and conditions, and to such other substantial purposes as may appear desirable; the amount apportioned to Quebec and the Maritime Provinces should be in the proportions in which the Fishing Bounties were distributed in 1928.

As stated, representations were made to us that interest upon the unpaid three years' interest so-called, should enter into the calculation, and amounts varying from three million dollars to fifteen million dollars were suggested to us as the sum we should recommend for appropriation by Parliament. So far as we know it is only in recent years that any such claim has been made. We do not think that there is any substance or foundation for this claim for accumulations of interest upon the three years' unpaid interest.

IX

OBSTRUCTION TO STREAMS

In many places protests were expressed against obstructions in rivers and inland streams frequented by fish, obstructions which, it was said, often prevented the movement of fish. We were also informed that certain streams were polluted, with resultant destruction of fish life. The chief agencies of obstruction and pollution of streams are dams, sawmills, pulp mills, abandoned mill sites, sawdust piles, manufacturing plants, and refuse. Such conditions, however caused, are inimical to the inland fisheries; they should be removed, and their recurrence should be strictly prohibited. There should be a vigorous enforcement of existing regulations, and if necessary other and more stringent laws should be enacted. In certain instances this may result in some hardship to an industry or other interests, but public interests must always be considered before private interests.

In order that these offences and violations of the regulations may actively come under proper investigation and control, we recommend that the Department request all inspectors and overseers to submit a census of all known obstructions and pollutions in their respective districts, which are in any way detrimental to fish life or to the movements of fish; that a vigorous and impartial enforcement of the law be carried out; and that additional laws or regulations be enacted if deemed necessary.

X

RAPID FREEZING OR BRINE FREEZING

Frozen fish have commonly been found to be in poor condition apart from any spoilage due to decomposition before freezing took place. In extreme cases a tough, spongy, tasteless mass is what remains after thawing. Investigation has shown that this condition results from slow freezing and long storage under unfavourable conditions. If frozen fish are to have the qualities of fresh fish, which are so necessary for the appreciation of the consumer, it is now generally admitted that rapid freezing is essential.

The Biological Board, under the direction of the Department, has studied this matter over a period of years, first at the Atlantic Biological Station, St. Andrews, N.B., and more recently at the Atlantic Experimental Station, Halifax, N.S. The conclusion has been reached that fish like those of the cod family, that appear to be the most susceptible to injury by slow freezing, will, if frozen in less than an hour, be to all intents and purposes indistinguishable from unfrozen fish, even after storage for six months under ordinary cold storage conditions. The Board has been using this result as the basis for the development of economical methods of rapid freezing and has worked out engineering data in this connection.

The practical methods of applying rapid freezing to fish are based upon the following considerations: The majority of fish are comparatively thin, being about two inches in thickness or less, except at the thickest part; also the modern trend of business is to have food rid of waste parts and in a form ready for immediate use. With ordinary salt brine at zero Fahrenheit it is possible to freeze a piece of fish an inch or somewhat more in thickness in fifteen minutes, whereas even with forty degrees below zero, which requires a special brine, a piece two inches thick will need an hour for equally complete freezing; ordinary refrigerating machinery is not efficient for such very low temperatures, which

cannot be obtained with salt and ice. Consequently, it is much more economical to secure rapid freezing by reducing the thickness of the material than by resorting to exceptionally low temperatures. In freezing the fish, if both sides are in contact with the brine either directly or through good conductors of heat, freezing is four times as rapid as if only one side has such contact. Rapid freezing, to be economical, should therefore be effected by using brine at about zero Fahrenheit and by bringing it more or less directly into contact with both flat surfaces of the fish.

The simplest freezer fulfilling these conditions is a tank of brine maintained at zero by the use of salt and ice. Two types of such a freezer have been developed and in both it has been found possible to lower the temperature to more than 2 degrees below zero before freezing is commenced. They are general purpose freezers for freezing a variety of products. The sizes depend upon (1) how large are the fish to be frozen, (2) the thickness of the fish, and (3) the quantity to be handled per day. The fish can be frozen in wire baskets, in cans, or on plates. It may come into direct contact with the brine or may be protected from it by waxed paper or other material. The plate method is a new development of particular value. The plates consist of sheets of galvanized iron with a rod along one side for support in the tank. If fish are placed upon wet plates and lowered somewhat slowly into the cold brine in a more or less horizontal position, they freeze fast to the plates. In this condition they are held flat, and down in the brine; they are in such a position as to permit of making the most of the available space in the tank without interfering with the circulation of the brine.

A tank has been designed for freezing one-half a ton of fish per hour with ammonia refrigeration. Two endless conveyor chains, one on either side at the top of the tank, carry the plates or receptacles for the fish in a steady stream through the tank. The timing of this conveyor is such that the fish are thoroughly frozen by the time they have passed through the tank. When they reach the far end, an ejector automatically removes them from the tank to a position ready for packing. In this tank also, fish can be frozen in a variety of ways, using baskets, cans, or plates, and with or without protection from the brine.

There is an increasing demand on the part of the consumer for food as fully prepared as possible for cooking or eating. Fillets consisting of the flesh of the fish alone are having an increasing sale. They may readily be frozen by the plate method described above, either with or without a covering for the exposed surface. An advance on the ordinary fillets is to pack them in standard lengths into cartons. A new process has been developed by the Biological Board, which consists of cutting up the fillets and forming them into half pound blocks, five inches long, three inches wide, and nearly an inch thick. These are wrapped in waxed parchment paper, frozen rapidly, and then packed, two in each pound carton. A special freezer has been designed for this product and for any other of uniform thickness. The blocks of fish, wrapped in paper, are placed in forms, which are carried by endless belts between pairs of flattened tubes through which brine circulates. The brine may be kept cold by using salt and ice or artificial refrigeration.

The cost of brine freezing, or rapid freezing, should not be prohibitive in many fishing communities, particularly if some assistance were given. Devices for its use may be established at a relatively low expenditure. It is estimated that a small plant, capable of freezing from five to ten tons of fish a day, would require an investment of not more than \$1,500. A small auxiliary cold storage building, using salt and ice, and capable of storing 50,000 pounds of brine frozen fish would require but a small outlay. These plants would take care of the production of 12 to 15 boats,—operated by 24 to 30 men. Brine frozen fish under ordinary conditions can be transported for a day without becoming

defrosted, and thus a central cold storage building of sufficient capacity could take the products of several brine freezing plants, distant not more than a day's transit, or take care of the surplus products from the smaller cold storage auxiliary plants.

From these storage places, or direct from the freezers, the brine frozen fish can be shipped out to supply market demands in far distant places. The finished product in fillets of clear meat, without skin or bones, wrapped in white, vegetable parchment paper and enclosed in sanitary packages, bears little resemblance to the whole fish bought in the old way. It is of superior quality, with the delicate flavour of fresh fish, with no fishy odour, and with no disagreeable cleaning to be done. As a result of the process, the housewife will be enabled to buy fresh fillets so rapidly frozen at very low temperature that the fresh cells do not break, the juicy textures and flavour are retained, no bacteria can breed, and all the qualities of the fresh ocean fish are present. And the fish is all ready to cook and requires no preparation. Dressed whole fish is prepared in the same way. With judicious advertising and demonstrations, we believe that this new form of package fish will soon win the favour of the Canadian consumer, and will bring about a great and advantageous change in the fresh fish industry, with benefit alike to consumer and producer.

XI

INSPECTION

(a) GENERAL.

Inspection of fish is authorized by the Fish Inspection Act, 1914, which applies to pickled herring, alewives, mackerel and salmon, and to the containers in which such fish are packed and marketed. By Order of the Governor in Council, the Act may be applied to other kinds of fish. All fish must be graded, packed and marked in accordance with the regulations authorized by the Act. Canned fish and canneries come under the operation of the Meat and Canned Foods Act. For pickled fish, such as herring, alewives and mackerel, the regulations prescribe the quality and size of the fish, and also how the curing, salting and packing shall be carried out. Barrels or other containers of pickled fish must be made in accordance with standards defined in the regulations, which also govern the weight contained in such barrels or containers. On the end of every container filled with pickled fish for sale, there must be stencilled the name and address of the original packer, or of the fish dealer who may have reconditioned them, and the grade and minimum weight of the contents. Non-compliance with these regulations is punishable by a fine, and in addition, the barrel and fish are degraded and are so marked. For smoked herring, the regulations prescribe the required condition of the fish, the size of the boxes to be used, and the weight of fish packed therein. They further require that the name and address of the packer be stencilled on each box, together with the minimum weight. Failure to comply with these regulations is subject to a penalty.

Standards of size and quality of dried and salted fish have recently been established as mentioned in another paragraph, and are now in force. The grading and curing in accordance with these standards is not obligatory, but if a buyer and seller agree to conform to such standards, they have the privilege of requesting an official inspector to determine whether or not the fish are in accordance with such standards.

The regulations prescribing inspection for pickled fish do not make it obligatory for inspecting officers to inspect and set an official mark on every barrel of fish before the packer disposes of it. They merely require that standards

be observed in grading, curing, salting and packing, but the fish may or may not be inspected. Stated briefly, the Fish Inspection Act provides that the maker or user of fish containers, and the packer of pickled fish, make or use standard containers, and cure pickled fish in accordance with the regulations; that an Inspector may at any time or place examine such containers, or fish, to satisfy himself that they comply with the regulations, and where they fail to do so, he is empowered to apply the penalty clauses of the Act, to degrade the fish, or to declare them unfit for consumption.

Our conclusion, based upon the statements made to us, is that the inspectors of pickled fish should be increased in number and that the regulations should be more strictly enforced. The Fishery Overseers are at present inspectors of canneries and canned fish under the Meat and Canned Foods Act. There does not appear to us to be any insurmountable difficulty in training such Overseers at the Atlantic Experimental Station, so that in addition to their other duties they may be qualified to inspect the various kinds of fish subject to inspection. In some districts at least, where fishing is not continuously carried on, we think this work might well be done by Overseers in addition to their usual duties, but this suggestion is not intended to be applicable to the larger producing or exporting centres. We would suggest that the experiment of adding fish inspection to the duties of Overseers might be made first in Prince Edward Island, where there are at present no fish inspection officers. The Fishery Overseers of that Province are capable men, who might be readily trained to perform such duties efficiently.

Throughout our inquiry, nearly all persons who appeared before us favoured the inspection of all fish, if practical or possible, and they expressed their willingness to submit to any method of inspection established. The ultimate success of inspection might be accelerated by educational work which would point out the advantages of a general system of inspection applicable to most fish, with the result that compulsory inspection would ultimately be acceptable to all those engaged in the industry. The fish merchant, too, may do much to hasten the final adoption of general inspection. The prices paid by him should vary according as the quality of the product meets the requirements of the prescribed standards or grades.

Thorough inspection of fish can be done only by well trained men. If inspection is to operate economically it must be provided only at a few large centres. To ensure observance of standards for the market, it is essential that specially trained inspectors be stationed at the principal shipping and distributing points, such as Halifax, Yarmouth, Charlottetown, Saint John, Montreal and Toronto. There should also be an extension of inspection to canned, frozen and smoked fish. In this connection proper grades of fish and methods for inspection should be worked out by the Atlantic Experimental Station as speedily as possible in co-operation with the fishing industry, through the Advisory Committee which is representative of the trade. When these grades and methods have been sufficiently perfected, the Department should arrange to introduce inspection, and to appoint inspectors who have been well trained and who have passed a satisfactory examination at the Atlantic Experimental Station.

(b) FISH PLANTS AND RETAIL SHOPS.

During our itinerary we visited a number of fish plants—that is places where fresh fish are landed and prepared for market in various forms. Representations were made to us regarding the alleged unsanitary condition of some of these establishments. We realize the difficulty of constantly maintaining fish plants in a thoroughly clean condition. But it must be remembered that the keeping of plants or premises in a reasonably hygienic state is a duty owed to the consumer and is essential if the consumption of fish is to be increased. It is obvious that fish plants, like all other food producing places, should be as clean

and attractive as possible. The more frequent use of pump and hose would not increase the overhead expenses to any noticeable extent, but it would result in cleanliness and in more hygienic surroundings. Concrete floors graded for drainage appropriate to each plant, should be another required condition. The importance to the fishing industry of having proper sanitary conditions wherever fish are being handled or held, from the fishing vessels to the retail shops, cannot be over-estimated. We recommend that the Department draw up reasonable directions as to the conditions under which fish should be handled at all stages, that such directions should be communicated to all engaged in the industry, and to all municipal authorities concerned. Such instructions are not suggested as constituting formal regulations, but are intended rather for the information of the industry, the field officers of the Department, and the municipal authorities, with a view to advancing steadily towards the desired end. We believe that all fish plants should be subject to rigorous inspection by fishery officers, and we recommend that provision be made for the requisite enactments for such inspection.

The condition of some of the retail fish stores, particularly in the smaller cities and towns, is far from satisfactory. We think we are not unfair in stating that in many instances they are ill-kept and not equipped in such a way as to encourage the consumption of fish. Municipal regulations on sanitary conditions are often enacted and enforced with respect to premises for the vending of all kinds of foods, but seldom or never with respect to retail fish stored. Many retailers seem to hold the view that fish may be handled without regard to cleanliness. This is particularly true of certain retail shops where fish are sold only on one or two days each week, and where the fish left unsold on these days is carried over without proper means for caring for it. The street hawker of fish should be subject to strict regulations, particularly as to the manner in which he conveys the fish; for too frequently it is carried uncovered in unsanitary vehicles in which it is exposed to sun or dust. The supervision of retail fish shops is, of course, beyond the jurisdiction of the Federal authorities, and is wholly a matter for municipalities. Nevertheless, we wish to record our emphatic view that, in the interest of retailer and consumer alike, all retail fish shops should be subject to municipal regulation. And we would call the attention of all municipal authorities to the necessity for prompt action in enacting and enforcing such regulations.

XII

FOREIGN MARKETS FOR FRESH FISH

The great importance of new markets for fresh fish of Canadian production is conceded. There would seem now to be an opportunity to develop a market in Great Britain and in Europe for certain varieties of fresh fish from the Maritime Provinces. Distributors of fresh fish in the Maritime Provinces who have considered the possibility of reaching these markets are of that opinion, and some of them have already made experimental shipments.

This possibility was the subject of an address by Mr. J. J. Cowie of the Department of Marine and Fisheries at the annual meeting of the Canadian Fisheries Association at Halifax, N.S., on July 7, 1925. He discussed the results of experimental shipments of fresh fish made to the United Kingdom, and the reception which it received in the markets there. Copies of this address are available to anyone interested in the matter. It has been demonstrated that fresh fish can be delivered to European markets in as good a condition as most fresh fish landed in these markets by local producers. There are, however, inherent difficulties which must be met in the development of

these markets, but they relate to organization and supervision in forwarding shipments, and in selling. Organized supervision and regulation of shipments will be necessary, to ensure uniformity in the size of the package, in the weight and quality of the fish, and in the method of packing and icing; and also in distribution in order to avoid overloaded markets. Mr. Cowie and Mr. G. R. Earle of Yarmouth, N.S., represented Canada on the Imperial Economic Committee during a portion of its inquiry into the fishery resources of the Empire; in a report of their investigations and observations regarding a market for Canadian fresh fish in Great Britain, they state that the Imperial Economic Committee believed fresh fish could be landed overseas in excellent condition, and that the adoption of rapid freezing would enhance the possibility of the development of this export market. They point out that conditions are still such as were described by Mr. Cowie in the address to which we have already referred, and that during the fall and winter months there is a demand in the British market for considerable supplies of iced fresh fish, mainly haddock and cod. They suggest that, at first, moderate supplies of the best quality should be forwarded in packages to suit the established trade, and they describe the size of the box or container required by the market. They state that shippers should co-operate to the extent of having all shipments made up and forwarded under the supervision and control of a shipping committee, or of a shippers' committee in each district where two or more shippers desire to explore this overseas market. The Atlantic Experimental Station is soon to ship to England a quantity of brine-frozen fish, to ascertain by actual experiment the condition of the fish on the arrival of the shipment.

We are aware that the matter of exporting Canadian fresh fish to the markets of Europe has been considered by a number of persons, some of whom have sought Government assistance in the experimental stages. One project was to establish a weekly steamship service to European ports with the view of primarily developing fresh fish markets, utilizing existing fish distributing organizations, and of opening markets for other Canadian products. We realize that in securing and developing this new market, there are problems to be solved, considerable capital to be invested, and marketing organizations to be built up; but nevertheless we believe that such efforts will be ultimately rewarded with success. Just how this trade may be initiated and conducted to a successful stage must be left to experienced persons prepared to venture into it. Our recommendation is that the Department should aid in the experimental stages of such an undertaking, if found necessary. If those seeking aid are in a position to present practical proposals supported by sufficient capital, experience and organization, we suggest that assistance might be given in the form of subsidies for transportation facilities.

XIII

EDUCATION

(a) GENERAL

Until recently facilities for the general instruction of fishermen in the various phases of their industry have not been available in the Maritime Provinces. For several years the Marine Biological Station and the Atlantic Experimental Station have done very valuable scientific work. The latter Station at Halifax under the direction of Dr. A. G. Huntsman, is to be particularly commended for its persistent and patient efforts and its successful results, all of which have been of incalculable benefit to the fishing industry. The researches, investigations and discoveries of the Station are proving, and will continue to

prove, of great practical interest and profit to fishermen. We were privileged to observe some of the experiments carried on in the laboratories of this Station, and we received much valuable evidence from Dr. Huntsman and the members of his staff in their particular field of endeavour. We cannot emphasize too strongly the invaluable results of their work.

Several years ago the Department, through the Biological Board undertook to interest fishermen in improved methods. In fishing communities, illustrated lectures were given on the fisheries generally, and on special topics such as the necessary measures for the conservation of the lobster. Educational courses of a technical character were given to fishery officers. Later, a somewhat aggressive educational campaign was carried on, with a view to improving the conditions in the lobster canneries, and this campaign was followed with gratifying results.

When the Atlantic Experimental Station for Fisheries was established at Halifax by the Department, the most important part of its extensive program was considered to be educational work among the fishermen, with the object of improving their methods of curing and handling fish. It was largely pioneer work with only meagre examples for guidance, for while efforts to provide instruction for fishermen had been made in Europe and the United States, they had met with but little permanent success because of temporary or flagging interest, and other discouraging causes. The chief cause, however, seemed to be the lack of new information which would sustain the continuous interest of fishermen. The Atlantic Experimental Station therefore, considered that, in order to avoid the failures experienced elsewhere, its first step towards success must be the obtaining of new information through experimentation.

While proceeding with experiments, all of which have been abundantly successful and are now of proven practical value, the Station undertook educational work in the processing of dried fish, as the methods in use along the coast were not equally good. Bulletin No. IX, containing an account of the best methods, was prepared and published and made available for fishermen. In 1926, an instructor, experienced in the best methods of splitting, curing and handling fish, was sent along the coast east of Halifax, where improvement was said to be necessary. In 1927, further instruction was given along the whole coast with considerable interest and success.

In a widespread and general application of more scientific methods to the fishing industry, in bringing directly and personally to fishermen everywhere a knowledge of the improved methods tested in the laboratories of the Atlantic Experimental Station, practically no completely organized attempt could, of necessity, hitherto be made. The members of the Station's staff could not possibly be expected to undertake it. Their work is research; they cannot also be travelling instructors, although they have already given freely of their time and talent to bringing information far afield from the Station to the fishing communities.

All the fishermen who appeared before us emphasized the necessity for technical education and instruction, and they were unanimous in their opinion that fishermen, on the whole, are now ready willingly to receive any instruction, theoretical or practical, designed to benefit the fishing industry. We cannot, therefore, agree with the ideas sometimes expressed to us that fishermen as a class are so attached to old methods that they would refuse to accept instruction in new and improved processes to meet the consumers' standards and requirements. From the evidence submitted to us, we believe, rather, that a practical system of education would be regarded with sympathy by fishermen, and that some form of education should be devised under the Department, in co-operation with the Provincial Departments of Education on questions of details or

arrangement. What has been done for agricultural education by the Department of Agriculture is an interesting example of what might be done for fishery education.

We strongly recommend that adequate assistance be authorized for fishery education in the Maritime Provinces, the details to be arranged by the Department in conference with the Provincial Departments of Education when deemed necessary, and with other competent and interested authorities. It is not our function to outline or to suggest the full nature of these details. We realize that any educational plan cannot be undertaken lightly, and that it presents serious problems. Its success will depend on the care with which its foundations are laid, and on the organization provided for its operation. We do not suggest that the administrative burden should be placed on the Director and staff of the Atlantic Experimental Station; on the contrary we believe that they should be relieved as far as possible of problems of educational administration. At present the Station turns over to the Department the results of its experiments and discoveries. How best to bring these results directly to the fishermen is the problem which will confront those entrusted with the development of an educational plan. We suggest that the Department direct the Biological Board to undertake the formulating of an adequate plan of fishery education, in conference with the Department of Fisheries, Provincial Education Departments, the Director of the Atlantic Experimental Station, and representatives of Dalhousie University School of Fisheries, and that they be given such assistance as they may require to arrange the details of such an undertaking.

We were told that the problems involved in such education have already been considered carefully by the Biological Board and its various committees. The Advisory Committee on Education of the Atlantic Experimental Station includes the President and certain members of the staff of Dalhousie University, the Principal of the Nova Scotia Technical college, the Principal of Truro Agricultural College, the Superintendent of Education for Nova Scotia, prominent men from the commercial branches of the fishing industry, and members of the staff of the Station. The difficulties of the problem differ from those of ordinary technical education and agricultural education. Two types of instructors have been used along the coast, first, men with knowledge of the scientific principles as well as of the procedure in curing, with much to impart, but lacking experience and skill in the actual methods; and second, men with considerable experience and skill, and able to demonstrate very effectively, but with little knowledge to impart. Each kind has proved to have both advantages and disadvantages. No broad scheme should therefore be attempted until the two kinds of advantages can be combined, either by educating the man with experience and skill, or by giving to the educated man greater skill and experience.

To achieve ultimate rather than merely ephemeral success, requires the more vigorous working up of the educational material in the various branches of fish handling and curing, and this should be encouraged and forwarded by every possible means. In the meantime, wherever there is a special desire or need for instruction in the carrying out of a definite process, such as the preparation of dried fish and boneless fish, and the pickling of herring, and when the educational material for this process has been found by test and criticism to be reliable and adequate, immediate steps should be taken to satisfy the need.

The Department distributes at frequent intervals pamphlets of instruction and information on various phases of the fishing industry. But the success of these bulletins, however valuable the ideas contained, is extremely doubtful. As a rule they are cast aside unread. They cannot take the place of personal advice, demonstration and guidance. We therefore recommend the extension and enlargement of the system of instruction by travelling instructors, already

established to some extent by the Atlantic Experimental Station, with a view to bringing to the fishing villages personal instruction in the various phases of the fishing industry, particularly in the best modern methods for the salting, curing, smoking, pickling, canning, packing and marketing of the various fish products, as well as in the building of simple and inexpensive bait freezers, smoking houses and driers; the care and repair of engines and other accessories, nets and general fishing gear; the use of by-products; with possibly some attention to navigation. Under such a plan the establishment of demonstration stations at various important and easily-reached centres will be necessary; these local stations could be used to demonstrate to fishermen the value and practicality of the results of experiments carried out at the Atlantic Experimental Station. Up to the present time there has been a scarcity of men qualified for such duties. The courses now given at the Atlantic Experimental Station, an outline of which we give later, and at the recently organized School of Fisheries at Dalhousie University, will produce young men adequately trained and qualified for this special educational work. We believe that the Governments of the Maritime Provinces should consider the awarding of scholarships to enable young men of promise in fishing villages to take courses in fisheries education, with the understanding that, on the satisfactory completion of their course, they accept employment for a stated period as instructors in their own province. The Province of Quebec has awarded such scholarships. Practical fishermen, with ability to instruct or demonstrate could likewise be utilized for instructional purposes. The Rural Conference of the Diocese of Antigonish of the Roman Catholic Church has given a commendable example by its generous granting of twenty-five scholarships to enable young men from fishing villages to take courses at Halifax.

The short courses now provided by the Department at the Atlantic Experimental Station are resulting in a greater interest in education and in a wider dissemination of useful knowledge. But we think that great care should be taken in the selecting of students for these courses, and that only young men with practical experience and intelligence to ensure an understanding of the instruction offered should be encouraged or assisted to attend. We suggest that the Universities of the Maritime Provinces might consider the possibility of aiding any efforts in behalf of fishermen's education, by giving in fishing communities simple and practical Extension Courses on subjects allied to the fisherman's calling: universities are today becoming more and more mindful of the requirements of the industries and the industrial workers in their communities.

With the already crowded curriculum of the schools, we do not see how the suggestion of specialized instruction in the schools of fishing communities can wisely or fairly be attempted. It should be possible, however, to include simple and instructive books for supplementary reading, explaining certain phases of marine life, in order that children may receive a knowledge of the habits of fish and the necessity for the protecting of fish life. Readings on bird life and on forest conservation are now provided. These have aroused deep interest in school children, and similar instruction on fish life would be invaluable in its ultimate results. Specific days, as now allocated to the study of forest conservation, might be set aside for its discussion.

It is perhaps interesting to note that the amounts paid for school purposes in the fishing villages and communities of the Maritime Provinces equal, and in some places exceed, the amounts paid in villages and communities engaged in other industries. This is a proof, if proof were needed, of the fisherman's interest in education and of his belief in its value. His own particular calling, however, has not been sufficiently encouraged by the technical educational methods now applied so successfully to other industries. When modern technical

educational methods similar to those in other industries are applied more extensively to the fishing industry in the Maritime Provinces there will probably be a greater inducement to young men to enter it, and to remain in it.

(b) EDUCATIONAL COURSES AT THE ATLANTIC EXPERIMENTAL STATION FOR FISHERIES.

Fishery education has been, as we have already said, a long time in coming. The reason would seem to be that scientific knowledge of the methods of the fisheries has developed but very slowly, and, without it, education could scarcely go beyond the apprenticeship stage. During the last three years, the Atlantic Experimental Station has been investigating the methods of handling fish, and already a fairly considerable body of knowledge has been built up.

In February, 1927, a course that had been given to Fishery Overseers was modified to bring in the newer knowledge of fish handling. A two weeks course was given this year to twenty-eight fishery inspectors and overseers,—nineteen from Nova Scotia, six from New Brunswick and three from Prince Edward Island,—and to eleven pickled fish inspectors, one from New Brunswick, and the remainder from Nova Scotia. As the course was to deal principally with the methods of handling fish, several people in the industry expressed a wish to attend, and consequently eleven were enrolled. The various courses and the time allotted to them were as follows:—Canning, 6 hours; Drying, 6 hours; Pickling, 6 hours; Refrigeration, 6 hours; Bacteriology, 6 hours; Physics, 12 hours; Chemistry, 12 hours; Discussions, 12 hours. Addresses were given as follows:—Conservation and Utilization, by Mr. W. Fisher, Inspector of Fisheries for N.S.; Canning, by Mr. R. H. Williams; Commonsense, Goodwill and Co-operation, by Mr. W. A. Wick; Marketing of Dried Fish, by Mr. A. H. Whitman; and Standards of Production by Mr. S. Y. Wilson.

No training was given in the actual processes, although these were described and demonstrated, and the principles thoroughly considered. The course was intended primarily for those with some experience in the fishery processes, or for those who desired to know more about the more approved methods.

The request from Canso for instruction for fishermen finally brought to completion the plans that had been maturing for teaching young men in the industry. At the sittings of the Commission, representations were made generally along the coast that instruction should be given in the curing of fish. The Rural Conference of the Diocese of Antigonish of the Roman Catholic Church informed the Atlantic Experimental Station that it had money to provide twenty-five scholarships to enable young fishermen to attend a course in fisheries. The Department and the Biological Board then decided that a course designed especially for fishermen would be offered, and that money would be available to pay the return railway fare and a sum of forty-five dollars each for twenty-five fishermen with the requisite common school education, to take a six weeks' course, including training in the methods of preparing fish for market. On January 18th the course began with an attendance of twenty.

The courses given and the hours for each were as follows:—Co-operation, 9 hours; Motor Engines, 36 hours; Natural Resources, 29 hours; Navigation, 36 hours; Preparation of Dried and Boneless Fish, 34 hours; Preparation of Pickled Fish, 34 hours; Science, 36 hours. In addition, there were nine evening lectures, including one lecture on the fisheries, illustrated with moving pictures. Attendance at these lectures was not compulsory, but the greater part of the class was present. A certificate was given to each student who satisfactorily passed an examination on the various subjects of the course. Seventeen certificates were granted, six with honours.

During the early part of the summer of 1927 educational demonstrations were given at the various lobster canning factories along the coast of the Maritime Provinces by four instructors. One of the instructors recommended that

courses of instruction of a fortnight's duration should be given at local centres to the managers of factories. The Advisory Committee on Canning of the Atlantic Experimental Station advised that a first attempt be made in Halifax, and the Biological Board offered such a course which began on March 16, 1928. Fifteen factory managers enrolled. The various courses of instruction and the hours allotted to each were:—Addresses, 2 hours; Bacteriology, 9 hours; Biology, 6 hours; By-products, 3 hours; Canning Lobster Paste, 6 hours; Canning Practice, 18 hours; Discussions, 8 hours; Equipment, 7 hours; Methods, 4 hours; Principles, 6 hours; Physics and Chemistry, 12 hours; Spoilage, 3 hours; Special attention was given to three things,—(1) The cause of and remedy for discoloration, (2) the causes of and remedy for springers, and (3) the preparation of lobster paste.

For some years past courses of a fortnight's duration have been given to officials in the Fish Cultural Service in the Maritime Provinces. Such a course was given in February, 1928, at the Atlantic Experimental Station. These educational courses are not intended for the training of men in fish cultural operations as this training is given by the inspectors in the service, but for the providing of practical education in the scientific principles of fish cultural practice with a view to helping the men to meet the special and unforeseen situations constantly arising in their work. Nine officers attended the course from February 8th to 21st. The courses given and the hours for each were:—Anatomy and physiology, 12 hours; Discussions, 18 hours; Fish Diseases, 12 hours; Fish Foods, 12 hours; Hatchery Practice, 12 hours; Science, 12 hours.

(c) THE BIOLOGICAL BOARD OF CANADA.

The Biological Board was originally constituted by the Department for the development of scientific knowledge related to the fisheries with a view to their conservation. Biological stations were accordingly established as bases for this work. The Board's work, which has been very considerably enlarged during the last ten years, now includes general and special investigations on the life and conditions in the various waters, and on fish culture,—also on methods of handling and curing fishery products, together with various educational undertakings. The Board acts also as the scientific adviser of the Department, and provides it with a variety of technical services of a scientific nature.

The work of the Board is essentially investigation and development, and is detached from the work of the Department and of the fishing industry. It develops the scientific basis, investigates problems, suggests means for overcoming difficulties, and advises or develops improved methods. Measures for conservation, which it formulates or proposes, and improvements in inspection and in fish culture, are turned over to the Department. The new methods which the Board may develop, or the suggestions it may make for improvement in the handling of fish are given to the fishing industry. The Board prepares educational material which is available to outside bodies such as the educational authorities of the various provinces. Fisheries educational work under the Dominion Government is, however, carried out by the Board.

With the enlargement of the scope of its activities, the organization of the Board has developed. Owing to the scientific nature of its work it is constituted chiefly of scientists from various Canadian universities. An officer of the Department is a member of the Board. Contact with the fishing industry on each coast is primarily established by a representative of the fishing industry who is appointed to the Board by the Minister.

The Board meets annually and elects a Chairman, and a Secretary-Treasurer as executive officers, also committees for the conduct of business between annual meetings. The Executive Committee includes the Chairman and the Secretary-Treasurer, and the members of the Board who are within convenient

reach of Ottawa. It serves as a central body for making decisions and determining policy in contact with the Department. Under it are two sub-executive committees, one for each coast, consisting of the members situated near that coast, with the representative of the fishing industry serving as Chairman, and the Director of the Station as Secretary. Each sub-executive committee acts in minor matters and considers local administrative questions for recommendations to the central executive committee. There are two Stations on each coast, which are related to the sub-executive committees through their director.

The Board conducts a considerable series of investigations on fish culture, not very definitely connected with the Station, but more closely related to fresh water and carried on at various points across Canada. These are under the supervision of a Research Committee on Fish Culture, which reports to the Executive Committee. Its members consist largely of the senior investigators of fish cultural problems. The Superintendent of Fish Culture in the Department is one of the members of the Committee.

The publications of the Board are dealt with by a Committee on Publications, of which the Editor is Chairman, and which reports to the Executive Committee. The Executive Committee of the Board serves as the nucleus of the Association Biological Committee of the National Research Council, which co-operates with the Board in preventing duplication of work.

The Atlantic Experimental Station is through a series of Advisory Committees in close touch with the various sections of the fishing industry and with the local educational authorities. Plans are now being formulated for making contact with the fishing industry at outside points.

The constitution of the Board provides a means for securing the voluntary service of the best scientific minds of the country for the planning and organization of the varied work. The fact that the Universities are represented on the Board serves to stimulate interest in fisheries research in the Universities, thereby providing volunteer investigators for the problems related to the fisheries. From these volunteers permanent investigators for the Board's future work may be recruited. The varied connections with the fishing industry and with the Department serve to focus attention on the most important problems in the conduct of the fisheries, and to provide regular channels for the dissemination and application of results. The organization of the Board is steadily bringing about such a co-ordination of work from the purely scientific but fundamental investigation to the final application in the industry as is essential for rapid improvement of methods.

The general organization of the Board appears well adapted for the purposes it has to serve, although as the work develops minor modifications will from time to time doubtless be necessary. In making appointments to its personnel, not only scientific but executive ability should be considered. At the present time the Central Executive Committee requires strengthening. Further appointments should be made to the research staff of the Board with a view to providing better technical service to the Department. There is particular need for a pathologist, a biological statistician, and a biological hydrographer. The pathologist is needed for the summary investigation of all troubles with the health of eggs, fry, and adults in fish cultural operations; he would also undertake, at the proposed experimental and demonstration hatchery of the Board, research work on the effects of various conditions on the vitality of the fish in its various stages. The biological statistician is required to take charge of the more regular collection of material for statistical study of the local populations of the more important food fishes with a view to formulating more adequate measures of conservation. The biological hydrographer would have charge of the collection of hydrographic data such as temperatures and salinities, from which to work out the seasonal and other changes in the water climate of the various regions, on which the distribution and abundance of the various fishes and their food is so directly dependent.

While the Atlantic Experimental Station is properly situated to serve as the centre for the experimental and educational work of the three Maritime provinces, the distances are such and the local facilities and requirements are so diverse that the Atlantic Experimental Station should be developed to a limited extent to serve for experimental work for the province of New Brunswick, particularly in connection with the sardine and herring industries. If an attempt is made to rehabilitate the oyster industry, a Station of limited scope should be established in Prince Edward Island, which would serve for investigation of the peculiar fisheries of the warm waters of the southern shallow part of the Gulf of St. Lawrence, and for experimentation in the handling of the products of these fisheries.

XIV

CO-OPERATION

Fishermen in general in the Maritime Provinces, and more particularly the shore fishermen, have not shared largely in the prosperity of the country in recent years. In other industries in Canada wages have been progressively high, but the shore fisherman's remuneration has not, on the whole, noticeably increased, nor has the purchasing power of his dollar paid for his implements of production grown greater. His toil has too often offered a maximum of hardship and a minimum of reward. His work has been carried on in places under conditions incredibly bad. Primitive methods of marketing have been followed. There has been little or no co-operation. In many parts, transportation has been difficult. There have been few technical educational facilities, such as are available to other industries. The shore fishing industry has drifted along in a happy-go-lucky, go-as-you-please manner and the individual shore fisherman has worked in his own way, often to his own disadvantage. For this condition he must himself, in fairness, accept some share of the responsibility. There has been no organization through which he could deal with large and complex problems and interests. He has not learned, like wage earners in other industries, to protect himself by organization and co-operation. He still sells, haphazardly, at a low level of prices and buys at a high level of retail cost. He has had heretofore no power whatsoever of bargaining; and having had little to say about the selling price of his product, unlike other producers he has been forced to take whatever price he could get,—a price sometimes below the actual cost of production.

Fishermen have not been organized to compel attention. They should get more of the consumer's dollar, and for his dollar the consumer should get more fish. The shore fisherman receives a smaller percentage of the dollar paid by consumers of fresh fish in large cities than is received by producers of other food commodities. *It has been established, with reasonable accuracy, that the producer now receives, on the average, from 30 to 35 per cent of the dollar paid by the consumer for food products. For example, the cattle raiser, on the average, receives 50 to 60 per cent of the amount paid by the consumer for meat, at times as high as 65 to 70 per cent of the retail price of the whole; the farmer, 35 to 50 per cent for his various products; the orange-grower, 40 per cent; the potato-grower, 35 to 40 per cent; the apple-grower 20 to 25 per cent; and even the cantaloupe-grower, who produces an extremely perishable product, 20 per cent. The evidence placed before us indicates that the shore fisherman receives, on the average for fresh fish, from 20 to 25 per cent of the consumer's dollar.

* National Distributive Conference, U.S.A. 1925. Report of the Commission on Agricultural Inquiry: report on Marketing and Distribution No. 408 U.S.A.

If the shore fishing industry is to succeed, co-operation among fishermen is absolutely and immediately essential. Co-operation is no longer an experiment. In Prince Edward Island, at least two Lobster Fishermen's Co-operative Associations are in existence. In one of these,—at Tignish,—lobster fishermen received for their catch last year two cents a pound more than the average received by other lobster fishermen; supplies for fishing were bought and products were sold to advantage by the organization. In the United States, the number of co-operative business organizations doubled from 1915 to 1925. Their membership increased fourfold, and their volume of business advanced from about six hundred million dollars to two billion four hundred million. Failures among co-operative organizations have been relatively less numerous than among private business institutions. In Canada, Egg Circles, Live Stock Breeders' Associations, organizations of Fruit Growers, Wool Growers, Potato Growers, producers of dairy commodities, the Wheat Pool, and many other similar associations are all outstanding examples of successful co-operative effort. And yet today in the Maritime Provinces over forty thousand fishermen have practically no co-operative associations!

We recommend, therefore, that the establishment of co-operative organizations of fishermen be assisted by the Department as soon as possible, and that an organizer, experienced in co-operative methods, be appointed and paid by the Federal Government for the required period to initiate and complete this work. A preliminary study and survey of the entire Maritime Provinces should be made to determine the localities where such organizations are possible or feasible. We do not conceive such an undertaking to be beyond the scope of Departmental responsibility or Government aid. The fisheries are a basic industry and are reasonably entitled to assistance and encouragement. A similar venture has already been aided for agriculture, in part at least. We are far from suggesting that the Government should enter into the business of buying and selling fish products; we merely suggest, rather, that it should help fishermen through their organizations to buy and sell for themselves to better advantage. If we may judge from the success of similar undertakings in Canada, we feel that in a very short time these suggested co-operative organizations would be largely self-supporting and would require a minimum of Government assistance. We are aware that under existing Provincial Acts such associations are now possible, but in their origin and their infancy they should be given every possible aid; it is clear that the fishermen themselves cannot, unaided, inexperienced and unguided, undertake to organize them. When such a project is undertaken, however, fishermen must realize that they must give a sympathetic response to the efforts to organize them; that they must help themselves; and that on their own efforts, success or failure will ultimately depend. From the history of organized labour in cities, and in other industries, they should perhaps have learned long ago the value of co-operation. They must now lose the old idea that they are isolated producers running separate industries and competing with one another; they must replace it with the thought that each is a unit in one great corporation.

We do not conceive it to be our function to discuss details or methods of organization. These must be left to the responsible authorities. But we suggest that after careful study the Maritime Provinces be divided into zones or districts, the limits of which shall be determined by the number of fishermen and the quantity of production; that each of these zones be organized into a fishermen's co-operative association; and that the zones so organized be again included in a Provincial body, and perhaps into one association of the entire Maritime Provinces. In certain places in each of the zones or districts so formed, small brine-freezing or rapid freezing plants, with a small auxiliary cold-storage building, with salt and ice equipment, should be established; and at a

central point, within a day's transit of these small local plants, a large cold-storage building, and possibly a fish-waste plant where warranted by quantity of waste, should be provided, all with initial subsidy assistance from the Federal Government. The large, central cold storage building would take care of surplus frozen fish direct from the freezers, or would take the surplus product from the smaller local storage buildings. More extended reference to brine-freezing has been made in another paragraph. From such an organization a Marketing Sales Board to control the output of the product from the various centres to the various markets, and selling agents to control the distribution in the larger places of demand, would dominate the market, keep it on a stable basis, and, with the organized power or bargaining, could dictate reasonable prices alike for producer and consumer, and gain a reasonable profit. Such a plan would ensure a more direct contact between producer and consumer, and would eliminate some of the costs for services which now intervene. Rapidly frozen fish kept temporarily in cold storage would take the place of fresh, unfrozen fish in periods of lean catches, resulting from scarcity or storm, and would ensure a steady supply. In short, what has been done in the co-operative marketing of farm and orchard products might serve as a model of organization.

Under such a plan loans for the purchase of boats or equipment, and also insurance on fishing property and equipment might be arranged for fishermen through their associations. Group life insurance might also be possible. We believe that such organizations would solve many of the fisherman's problems and would establish his industry as a profitable and lucrative pursuit, giving to those engaged in its primary operations the independence and adequate reward which have hitherto been lacking. It would give him the security of an assured market, and a market price according to the quality of his product, a bargaining power which he has never yet possessed, and a greater share of the consumer's dollar than he has heretofore received. Hitherto he has had no machinery to enable him to get what his product was really worth. With co-operation his industry would be placed on the level of security and power to which, by similar methods, other industries have so successfully and remuneratively attained.

XV

ADMINISTRATION OF FISHERIES

(a) MINISTER OF FISHERIES

Numerous representations were made to us on the necessity for the establishment of a separate Ministry of Fisheries. It was pointed out that a separate Department of Fisheries would elevate the industry in importance, would stimulate a greater public interest in its special problems, and would permit of undivided administrative attention, thereby ensuring a more extensive and complete organization. The suggestion was also made that with the extensive fisheries of the Atlantic and Pacific coasts, and such of the inland fisheries as are under Federal control, there is a sufficiently large field for administrative work in the future to justify the creation of a separate ministry. It was contended that the Department of Marine and Fisheries has so wide a jurisdiction and such a variety of problems, that, as at present organized, it is unable to devote sufficient time to fishery matters.

Much can be said in support of this view. The fishing industry is territorially widespread on both the Atlantic and Pacific coasts, each area having difficulties that are dissimilar from those of the other. It is great in variety, in extent and in value; it holds a very large place in the economic life of the

country; and in all its phases it is beset with complex problems of administration. The industry may, therefore, justly claim to be of such importance as to require a separate Ministry. Last year, Parliament authorized the appointment of a Deputy Minister of Fisheries. We found throughout the Maritime Provinces a widespread feeling not only in support of this action, but also in support of the establishment of a separate Department of Fisheries under a Minister of Fisheries, and we recommend the creation of such a Department to the consideration of the Government of Canada.

(b) DEPARTMENTAL ORGANIZATION.

We were not asked to make any general survey of the Departmental organization, but we wish to point out in what respects the Departmental Staff should in our judgment be increased and strengthened for the performing of additional services.

(1) Fisheries Intelligence Branch: There is need for a fisheries intelligence branch under the direction of a highly qualified officer. We were much impressed with the widespread demand for reliable and regular information, particularly regarding the production and market conditions of other countries; the stocks on hand from time to time; market prices and forms of marketing; recent developments in the industry in Canada and elsewhere; statistical information of all kinds; and, in general, information of any nature which might be helpful in the intelligent direction of the industry. Information of this nature accurately collected, and properly edited and circulated by a regularly issued fisheries intelligence publication, would prove of great interest and of much value. This is not a light undertaking if it is to be properly and effectively performed. We recommend the creation of a fisheries intelligence branch in which such work may be carried on.

(2) Statistics: Accurate and complete statistical information concerning any industry is of great importance. Conditions of supply and demand, the actual state of domestic and foreign producing and consuming markets, the scientific study of the conservation of any particular variety of fish and its regulation, market prices, and many other subjects are capable of intelligent study only when complete statistical data are available. The fishing industry cannot be intelligently conducted without reliable statistical information available to those engaged in it. We believe that the fisheries statistics of Canada compare favourably with those of other countries, and we realize the many difficulties attending the collection and compilation of statistical information because of the widely scattered location of the fishing population and the great extent of the coast line on which fishing is carried on. We have reason, however, to doubt the substantial correctness of some of the official statistics, and this makes impossible definite conclusions upon many important matters placed before us for consideration. It should be possible to devise some system of gathering statistics from fishermen, fish dealers, transportation companies, and other agencies, as well as from fishery officers, and such statistics should be immediately and critically studied in order to determine their significance and any peculiar conditions they may disclose.

(3) Research Branch: A scientist should be appointed to the staff of the Department to furnish it with constant advice on scientific matters and technical services of a scientific nature. He would serve as a connecting link between the Department and the Biological Board, and he also should establish connections with the proposed National Research Laboratory, in order to advance in that institution researches which might relate to the fishing industry.

(4) Director of Fisheries, Atlantic Division: There is also need for an officer—whose title we suggest might be Director of Fisheries, Atlantic Division

—who would have general supervision over all the various services of that section. Whether such an officer should be of the outside service and permanently resident at some point on the Atlantic Coast, or of the inside service, and resident at Ottawa, is perhaps debatable. It was suggested to us that if he were resident at Ottawa, he would perhaps have a wider knowledge of his duties and more authoritative control of all those under him. We merely recommend the appointment of such an officer. A Director of Fisheries, Atlantic Division, is primarily required to bring into the administration a very thorough knowledge of the extremely varied local conditions and needs. He must be prepared to develop the closest contact with the various sections of the coast to which the major portion of his time should be devoted.

(c) DEPARTMENTAL OFFICERS.

During the course of our enquiry we came in contact with almost every Inspector and Overseer in the Maritime Provinces. On the whole, we found this branch of the service composed of capable and earnest men, with an intelligent and active interest in their official duties. We were told, and we believe, that the service is incomparably better than it was a few years ago. In former years it was unable to attract capable persons because of the small remuneration offered. Some officers are naturally more capable than others. The least capable in our judgment are those who feel that their work includes only enforcement of the laws, and other routine duties. The majority, however, while faithfully performing all these duties, study fishery problems and give freely of their counsel and friendly interest to all those engaged in the industry within their districts.

Inspectors and Overseers all come constantly in contact with the fishermen; they should therefore be trained and fitted in some degree, at least, to instruct and assist fishermen in many of their difficulties. The present appointees should be required to take a special course at the Atlantic Experimental Station; and a special examination should be set by the Biological Board, or some other qualified authority, for those who wish to qualify for the service. Several of the present inspectors have already taken the course offered at the Station. The work of the Overseers varies greatly in districts; in some districts where the area is very extensive Overseers have more than enough to do. We recommend that the Department consider a rearrangement of districts, and, in busy seasons, the appointment of part-time assistants. The salaries paid to Overseers are uniform. In some cases the salary is not ample for the services performed, and we think the Department should consider a revision of salaries. This service is extremely important; it calls for properly trained men, with tact and executive talent, and with a genuine and intelligent interest in the fisheries and fishermen. The engaging of this type of Overseer should be the aim of the Department, and when secured he should be properly paid. We think it would be useful to bring the Inspectors and Overseers of each Province together annually, for the discussion of fishery problems and future work. Representatives of voluntary provincial organizations for the protection and conservation of fish should be invited to attend such meetings, as well as representatives of all branches of the commercial side of the industry.

Fishery Guardians are part-time officers. We were frequently told that because of age or general incompetency some of them were unsuitable for their office. The Inspectors have power to dismiss inefficient Guardians, but this power is, we think, too seldom exercised. Representations were made to us that in places no attempt was made by Guardians to enforce the laws, particularly those governing the netting of salmon and shad in rivers, and, to ensure greater independence of action, that Guardians be selected from a locality other than that in which their duties are to be performed. We do not know if this suggestion is practical, particularly in view of the small salaries paid,

and the short season during which they are employed. This Branch of the service is likewise important, and in order that a standard of competency be attained, the Department should prescribe some definite qualifications for the office. In the enforcement of regulations, Guardians or other officers should be actively supported by the Department, and any outside interference with them should not be permitted. Our experience is that everybody wishes rivers and streams protected from illegal fishing, but apparently in practice few give moral support to the officers, or desire to see violators of the law punished.

The amount granted to Overseers for purchase and upkeep of their automobiles is in our judgment not at present adequate and should be increased by at least fifty per cent. The cars are in use very early in the spring and late in the autumn when roads are in the worst possible condition. The result is that repairs are frequent and expensive, and the life of the car is abnormally brief. To this expense, the cost of gasoline must be added, and in the Maritime Provinces such cost is unusually high.

XVI

QUEBEC AND THE MAGDALEN ISLANDS

In the circumstances already stated, the Commission held a hearing at Gaspé, P.Q. Since then representations were made to us at Montreal and Ottawa respecting the fisheries of the Province of Quebec. As the Government of Quebec administers the fisheries of that Province, we feel limited to a general presentation of conditions as we found them, and of the opinions expressed to us suggestive of means for their general improvement.

We found the fishermen of the Gaspé Peninsula especially eager for instruction and education in all phases of the fishing industry there carried on, from the stage of production to that of marketing. Any steps in this direction taken by the Government of Quebec will be of great service and will meet with a sympathetic reception. A pleasing incident of our public hearing at Gaspé may very appropriately be referred to. At this meeting there appeared before us two young men, Messrs. Berube and Kavanagh, who, by means of scholarships commendably granted by the Government of Quebec, were enabled to graduate from the Fisheries School of the University of Washington at Seattle, U.S.A. Mr. Kavanagh is now a fishery officer in the Gaspé district, and Mr. Berube is manager of a corporation carrying on a general fish business in the Gaspé Peninsula. These two young men, well instructed in all branches of the fishing industry and zealous for the adoption of the best standards, will, we feel sure do much to stimulate a deeper interest in the fisheries of the Gaspé Peninsula, by the application of improved methods and scientific knowledge. Their special qualifications should be constantly utilized in promoting the welfare of the industry and those engaged in it in the Province of Quebec, and perhaps even in other Provinces.

Representations, oral and written, were made to us regarding the condition of the fishing industry on the north shore of the Gulf of St. Lawrence last year. While we cannot speak from personal observation, or from evidence directly made to us by fishermen from that district, we are strongly of the opinion that a special investigation of the industry and the conditions under which it is there carried on, should be made by the Fisheries Department of the Province of Quebec. This investigation should be made as early as possible, and by the most competent persons available. As mentioned elsewhere, it would seem that the quality of dried salt fish produced there recently, is not equal to the standard

of former years. As a result, the industry has suffered. The causes of this decline in quality should be investigated and, if possible, removed.

In marketing the fish products of the Gaspé Peninsula and the north shore of the Gulf of St. Lawrence, most of which is without railway communication and is completely isolated during many months of the year, shippers have to rely upon subsidized steamship services performed under contract by the Clarke Steamship Company. In the Gaspé Peninsula we were informed that the present subsidized service to Montreal does not afford adequate refrigeration facilities for the shippers of certain varieties of fish, particularly fresh salmon. This district is at present served by two boats, the *Northland* and the *Gaspesia*, both of which run on a regular schedule; but they do not follow the same route, and the result is that at some points the service is irregular. It may happen, for example, that one boat may call at Gaspé one day, followed by the other boat the fourth day later, with no call by either boat for the next ten days. Shippers naturally complain that with such uncertainty in the service the marketing of fresh fish is rendered extremely difficult. Again, it is complained that only the steamer *Northland* is equipped with cold storage facilities, with the result that fresh fish shipped on the other steamer, though carefully packed in ice or snow, frequently reaches the market with its quality far below the desired standard. Accordingly, there is a demand for improvement in the service performed by the Clarke Steamship Company. We recommend a reconsideration of the existing contract with the view of affording to this section of the country more adequate transportation facilities.

Railway freight and express rates are also complained of in that portion of the Gaspé Peninsula which has railway connection at Metapédia with the Canadian National Railway system. Shippers using the railway complain that they are obliged to pay a freight rate from half a cent to one cent more per pound upon fresh fish than their competitors of the Maritime Provinces, and they also complain of the lack of sufficient or adequate refrigerator cars. We mention these matters merely to draw the attention of the Department of Fisheries of the Province of Quebec to these complaints, as we have not had an opportunity to inquire into them.

Requests were made to us for harbour improvements or shelters for shore boats on the Gaspé Peninsula. Serious consideration should be given to this request of fishermen who follow their occupation along this exposed and isolated coast line. We recommend that the Department of Public Works make an early survey of this section of Quebec to ascertain the requirements of fishermen in this regard, as only very general statements were made to us.

Among the various matters we were asked to communicate to the Department of Fisheries of the Province of Quebec, for its consideration, are the following:—The creation of a Departmental organization giving special attention to the grading and inspection of fish; the establishment of a technological and biological laboratory for experiments in the preparation of canned fish and the manufacture of fish by-products; the institution of a Bureau of Information on existing fish markets, prices, additional markets, and fishery statistics; a scientific study of the oceanography of the River and Gulf of St. Lawrence from a biological point of view; a study of the migration of the different species of fish, and the effect of temperatures and currents upon them; the making of fishing charts or sea-bottom charts for the use of fishermen; and the adoption of a policy of subsidies for cold storage plants, fish canning factories, drying establishments and reduction plants.

We shall cause to be transmitted to the Minister of Fisheries of the Province of Quebec a copy of the evidence presented to us at our meetings there, together with copies of any important documents or statements filed with us.

A brief reference is necessary to one or two matters of interest peculiar to the Magdalen Islands. Representatives of the fishermen of these Islands expressed a desire for instruction in the proper methods of curing fish, particularly mackerel. We recommend that during the present year, a person qualified to instruct the fishermen, especially in the curing of pickled and dried fish, be sent to the Magdalen Islands.

It was also suggested to us that the inauguration of an air mail service during the winter months would be most invaluable. Such a service has since been established, and it is unnecessary for us to say anything further concerning it.

Large numbers of fishermen leave the Magdalen Islands towards the end of the fishing season to engage in other employments, with the intention of returning as early in the spring as possible to resume their fishing occupation. It was pointed out to us that the first trip of the subsidized steamship service plying between the Islands and Pictou, N.S., is usually too late to enable the fishermen to reach their homes at the opening of the fishing season, and it was suggested that a special sailing of a suitable steamship be provided each year by the Department on a specified date in the month of April, from some port in Nova Scotia, to convey the returning fishermen to their homes. The date of this sailing, if provided, should be advertised well in advance. Considering the isolated position of the inhabitants of these Islands, and the many inconveniences and disadvantages under which they labour, we recommend that this request be acceded to. By doing so the Department will be rendering a useful service, and one which we think in all the circumstances well justified.

XVII

CONCLUSION

We have approached the study of the problems submitted to us for investigation with the hope of finding solutions where such solutions were possible, or of suggesting, at least, methods for permanent relief, rather than with the idea of providing temporary palliatives. Many of the matters submitted to us in the Terms of Reference for detailed study are in themselves sufficiently perplexing and entangled to warrant special investigation. They have already been made the subject of prolonged and exhaustive single enquiries in other countries, without final solutions being found for the problems involved. The difficulties and disabilities are so many, so varied and so intricate, that their complete and final removal will require from the Department patient and perhaps prolonged endeavour. Nevertheless, we feel that many disadvantages can be displaced; and that more complete conservation of the fisheries, more adequate returns to the fishermen, and greater prosperity for the industry in general, are not beyond reasonable expectation or possibility. A larger amount of invested capital is needed; a larger expenditure by the Federal Government, temporarily at least, is urgently required; and more co-operation among fishermen and dealers is essential. The fisheries of the Maritime Provinces are capable of great expansion; with further regulations and additional constructive plans for their advancement they will undoubtedly hold their place as one of the greatest of Canada's natural resources; and those engaged in their development, in either primary or secondary operations, will continue with adequate encouragement to form a most important and significant portion of Canada's population.

The Commission desires to express its appreciation of the assistance rendered it, at all times, by Mr. A. Johnston, Deputy Minister of Marine and

Fisheries, Mr. W. A. Found, Director of Fisheries, Mr. J. J. Cowie, Chief Inspector of Fish, and the officers of the several branches of the Department of Fisheries. The thoroughness and efficiency of the organization in connection with the arrangements for our itinerary, and the attention given to every detail by the Departmental Representative, Mr. W. J. E. Casey, contributed much to our success in keeping every appointment. We are also grateful to the Master and Officers of the C.G.S. *Acadia* for their courtesy and attention during the early part of our itinerary. Dr. A. G. Huntsman, Director of the Atlantic Experimental Station at Halifax, with the capable officials working with him, were ever ready with information and advice, while the inspectors and overseers in the several fishery districts in the Maritime Provinces and Quebec were zealous in their attention to the requests of the Commission, and facilitated the inquiry in every way. Various Departments of Government, especially the Department of Trade and Commerce, have helped us greatly with statistical information. Boards of Trade and other public bodies and fish merchants and dealers also gave assistance and information which contributed much to the record, and the interest shown by the fishermen and their readiness to place their views before us, were of much value. To all associated with the work of the Commission we desire to express our appreciation of the very valuable services rendered.

We are unable to make a unanimous report on the subject of Steam-Trawlers. Two reports are therefore submitted, report 1 by four members of the Commission, and report 2 by the Chairman of the Commission.

A. K. MACLEAN
CYRUS MACMILLAN
H. R. L. BILL
JOSEPH MOMBOURQUETTE
J. G. ROBICHAUD.

XVIII

STEAM-TRAWLERS

REPORT 1.

Of the evidence submitted to us during the course of our enquiry, perhaps the largest and most important portion had reference to steam-trawlers. On the part of fishermen there was a widespread feeling expressed in opposition to these vessels; protests against them were emphatic and practically unanimous, and no doubt was left in our minds as to the seriousness with which the fishermen regard the present unsatisfactory situation, alleged to be, to a large extent, the result of the operation of steam-trawlers.

Steam-trawling, or otter-trawling, is carried on by steam vessels of from 250 to 300 tons gross, which are similar in the nature and arrangement of their gear. The trawl is a large conical net or bag about 150 feet in length, which is towed along the bottom of the sea. The mouth of this huge bag is kept open laterally by boards or "doors" or short wooden walls, one on each side, resting on the sea, and so rigged that they operate like kites. As the trawl is towed along, these "doors" are pulled apart by the resistance of the water, thus opening the bag. The lower side of the mouth of the bag, which rests on the sea-bottom, is secured to a line reaching from "board" to "board." The upper side of the bag is secured to a somewhat shorter line, and, thus, as the bag is towed along, the top portion of its mouth extends considerably in advance of the lower portion. The "boards" are heavily shod and rein-

forced with iron. At ordinary towing speed their kite-like action extends the net laterally to a width of over one hundred feet, and the flow of water into the net tends to keep it open vertically. In the forward third of the bag the mesh of the net is largest; in the centre third, smaller; and in the last, or end, third, smaller still. The end of the net is open, but is closed, when fishing, by a draw-string.*

The steamer generally takes a day to reach the fishing grounds; it trawls three or four days, and then returns with its catch to its home port, the average trip taking about five days. In operation, the trawl or bag is towed slowly along the sea-bottom at a speed of three or four miles an hour, usually for a fishing period of from one to two hours. It takes up everything in its track, as one fisherman expressed it, "from a scallop to a four thousand pounds anchor." Fishing goes on day and night. At the end of each fishing period the trawl is raised over the deck by a winch, the draw-string in the end of the bag is loosed, and the fish are dumped on the deck, sorted and packed in ice in the hold, in boxes or "pens". The inedible fish and the immature fish are thrown overboard or washed into the sea through the scuppers, unless the trawler operator runs a fertilizer plant or a fish-meal plant, to which such fish are taken for manufacture. The average steam-trawler is capable of taking about 300,000 pounds of fish in one trip, but we were told that a fair average catch throughout the year is from 150,000 to 175,000 pounds.

Statistics from the National Fish Company covering nine landings at Halifax from March 9th to March 14th, 1928, give the smallest catch as approximately 135,000 pounds, and the largest catch as approximately 255,000 pounds; the average catch in that period was approximately 190,000 pounds, including inedible fish. During the same period steam-trawlers operating for the Leonard Fisheries Company had in three landings an average of approximately 128,000 pounds exclusive of inedible fish, which were culled on the banks. At present, ten steam-trawlers are operating out of Nova Scotia ports, of which six are said to be owned and registered in Canada as follows: Rayon D'Or, registered in Halifax in 1916, owned by the Maritime Fish Corporation; Loubyrne, registered in Montreal in 1924, owned by the Leonard Fisheries Company; Lemberg, Venosta, Viernoe, and Good Hope, registered in Halifax, respectively, on November 26, 1927, November 28, 1927, December 27, 1927, and November 25, 1927, and owned by the National Fish Company. The following are owned and registered in England or Newfoundland and are under time charter to Canadian companies: Bonthorpe, and Sleaford, owned and registered in England, and chartered by the Maritime Fish Corporation, Cape Angulhas, owned and registered in St. John's, Newfoundland, and chartered by the National Fish Company; and the Offa, owned and registered in England and chartered indirectly by the Leonard Fisheries Company. The steam-trawler carries a crew of from sixteen to twenty-one men. The men are paid about \$35 a month, and \$6 for each thousand dollars' worth of fish taken. The total monthly earnings of each man are approximately from seventy-five dollars to one hundred and twenty dollars.

Since 1910 when the trawler *Wren* was put into operation in Nova Scotia by the Maritime Fish Corporation, the increase in trawlers has been as follows:—

1910, one; 1911, one; 1912, two; 1913, five; 1914, four; 1915, four; 1916, five; 1917, six; 1918, eight; 1919, seven; 1920, six; 1921, six; 1922, seven; 1923, seven; 1924, eight; 1925, nine; 1926, eleven; 1927, ten.

Ever since steam-trawlers first began to operate from Nova Scotia ports and to dispose of their catch in Canadian markets, they have been the subject of keen controversy in the Maritime Provinces. Indeed, the steam-trawler has

* See Appendix No. 13.

always been a storm centre of discussion in every country where it has been used. Its chief opponents, everywhere, have been the shore fishermen, who for the purposes of this report may be defined as fishermen characterized not so much by the size of their boats or the distance of their fishing grounds from the shore as by their style of fishing and the nature of their business methods. They fish with line or line-trawls; they may fish far off shore where great navigating skill is necessary, and from this standard they might therefore fairly be regarded as off-shore fishermen; but from the standards just mentioned,—method of fishing and selling,—they are shore fishermen. The steam-trawler fishes directly for a company under ownership or charter. The shore fishermen usually sells his fish at a local price to a local buyer, who forwards it at his own risk and profit to other markets for resale.

The protests of the shore-fishermen against steam-trawlers are not new, nor are they wholly the result of conditions prevailing in recent months. They have been persistently and repeatedly made during practically all the years in which steam-trawlers have operated from Nova Scotia ports. A brief outline of the history of these protests may be of interest, as giving a better understanding of the question at issue. In 1905, when the Halifax Board of Trade asked for assistance from the Federal Government to bring out trawlers from Scotland to operate in Nova Scotia, assistance was promptly refused, as indicated by the following letter written on June 5th, 1905, by the Minister of Marine and Fisheries at that time, to the Chairman of the Fisheries Committee of the Halifax Board of Trade:—

"Referring to the matter of the introduction of steam-trawling in Atlantic waters of Canada, I have an official report before me, and I do not see that any encouragement could be held out to steam-trawl firms to operate in our waters. You are no doubt aware that to that destructive method of fishing has been attributed the destruction of valuable fisheries off the shores of Great Britain, and prohibitory laws have been enforced in inshore areas. Outside the three-mile limit trawling cannot be prevented, but I am not disposed to favour it in territorial waters or grant assistance to firms adopting that method of fishing."

Vigorous protests were made when foreign steam-trawlers began to fish too near to the Atlantic coast line and to interfere with the operations of the shore fishermen; and on September 9th, 1908, an Order in Council was passed providing that "the use or operation of vessels known as steam-trawlers operating beam, otter or other trawls for the purpose of catching fish is prohibited within the three-mile limit and in the bays and harbours of Canada." This was obviously an admission that steam-trawling was injuring the shore fisheries, and that it required regulation and restriction. In 1909, during the Imperial Defence Conference, the Canadian Minister of Marine and Fisheries, and the Prime Minister of Newfoundland urged upon the British Government the desirability of making an international arrangement with France and the United States for the regulating of all fisheries on the banks. But no arrangement was made. Protests against steam-trawling, however, continued to be expressed in the Maritime Provinces, and as a result, the following resolution was passed unanimously by the House of Commons on February 6, 1911:—

"That in the opinion of this House, as the mode of fishing known as steam trawling prosecuted by ships of different nationalities on the coast of Canada outside Canadian waters is destructive to fish life, it is expedient in order to conserve the deep sea fisheries, that negotiations be opened with the view of securing an international agreement prohibiting this mode of fishing in such spawning grounds for deep sea fish as the waters of the Gulf of St. Lawrence and the banks of the North Atlantic adjacent to the coasts of Canada and Newfoundland."

In the meantime, bounties had been paid one year to fishermen on the steam-trawler *Wren* operating from a Nova Scotia port, and as a result of objections from fishermen, an Order in Council was passed on February 22, 1911, excluding fishermen on steam-trawlers from sharing thereafter in the fishing

bounty. The agitation against steam-trawlers continued unabated, and on February 5, 1912, when only two steam-trawlers were operating from Nova Scotia ports, the Minister of Marine and Fisheries said in the House of Commons,—

“It is realized that if many steam trawlers are shortly placed in commission on Canadian coasts the hand trawls and long line fishermen will find it hard to compete, and anything that the Government can do to protect them, it is anxious to do.”

Meanwhile in Nova Scotia, meetings of fishermen, organized in protest, were held in various places, notably in Canso. From a meeting of deep-sea fishermen at Lunenburg on February 9, 1912, a delegation was sent to Ottawa to interview the Federal Government, with a petition asking that steam-trawlers be prohibited from landing their fish in Canada and from obtaining Canadian coal and supplies. During the session of 1912, the Legislative Assembly of Nova Scotia unanimously passed the following resolution:—

“Resolved: that this House reaffirms the resolution unanimously adopted on the 5th day of April, 1909, as follows:—

“That this House deem it imperative to advise the Federal Government, and it is hereby so advised, of the impending danger to the provincial fisheries from the introduction and use in pelagic waters adjacent to the coast of the devices called otter-trawls, operated by steamers from the British Islands and from France, from which a great influx is contemplated the coming season, to the imminent peril of the said fishing grounds as threatening to deplete them by a method proved the most destructive to the food fishes and their spawn, a fact tacitly admitted by the Dominion Government in debarring said trawlers from the littoral waters.

“And further resolved that the Federal Government is hereby memorialized to set in motion the powers of diplomacy through the Imperial Government to bring about an international convention between the countries immediately concerned, for the suppression of the said manner of trawling in open sea.

“Further resolved that in view of the very great importance of this subject to the fishermen of this province, of their very strong desire that steam trawling be prohibited and of the necessity of the fullest co-operation on the part of the Canadian Government at this particular juncture, this House places on record its exception to any views intended to raise doubts as to the injurious and destructive effects of steam trawling upon our fisheries.”

On March 18, 1912, the Minister of Marine and Fisheries said in the House of Commons, “If it is possible to do so, effective steps will be taken to prevent steam trawling being carried on.” During the early summer of 1912, a conference was held in Washington, attended by representatives of the United States, by the Canadian Minister of Marine and Fisheries, and by the Prime Minister of Newfoundland, with a view to investigating the whole question of steam-trawlers and of making observations on the results of their operations. After considerable negotiation, it was arranged that during the season of 1912 investigations would be carried on by each country independently, the understanding being that on the completion of the work, the British Government would be asked to call a conference of representatives of countries interested in steam trawling with a view to reaching an arrangement for the entire prohibition of steam-trawling on this side of the Atlantic. The investigations took a longer time to complete than was at first anticipated. Meanwhile the war had come. It was then decided to postpone the request for the projected international conference until after the end of the war; but the proposed conference was not held. In order meanwhile to protect further the shore fishermen, the Canadian Government in 1915 enacted a regulation under the Customs Act, whereby, the master of any steam-trawler is required before he is granted a clearance for the fishing grounds to give the customs officer a declaration that he will not fish within at least twelve miles from shore, this regulation to apply to all steam-trawlers clearing from a Canadian port on the Atlantic coast. Since that time no further restrictions have been placed on steam-trawlers operating from ports of the Maritime Provinces.

From this brief and general outline of efforts made in Canada to regulate or prohibit steam-trawlers, it is evident that ever since the beginning of their operations from Maritime Provinces ports, they have been the subject of almost continuous protest and discussion.

In other parts of the world where steam-trawlers have operated, similar objections to them have been repeatedly made. The fishermen of Gloucester, Massachusetts, have from time to time registered their protests. In Scotland, when the shore fishing industry was vanishing and the fishing villages were fast becoming depopulated, steam trawling was the subject of many prolonged Government enquiries. Laws were passed in 1885, empowering the Board of Fisheries of Scotland to prohibit the use of steam-trawlers in the territorial waters of Scotland. They were accordingly prohibited from operating in certain areas; and to ensure further protection to the shore fisheries, they were later debarred from landing fish taken in these areas. In 1908, the British Parliament passed the "Prohibited Areas Extension Act," the first section of which provides that,

"It shall not be lawful to sell or land in the United Kingdom any fish caught by the method of fishing known as steam trawling or other trawling within the areas in which such methods of fishing are prohibited."

Laws enacted subsequently with reference to steam-trawlers and the ports of Scotland were passed too late to restore the fishing population or to bring back success to the fishing villages. In Denmark, Holland, and Germany, strong objections to steam-trawling have frequently been made.

The chief objections to steam-trawlers, expressed to us by the shore fishermen may be enumerated as follows,—(1) that they destroy the spawn of cod and haddock; (2) that they destroy the feeding grounds of fish, with disastrous results; (3) that they take large quantities of immature and unmarketable fish, the result of which, with intensity of fishing, will be the inevitable depletion of the fishing grounds; (4) that they are foreign-owned and foreign-manned; (5) that they destroy the gear of fishermen without making restitution; (6) that they market an inferior product, which in the end injures the industry by discouraging the consumption of fish; (7) that they are responsible for over-production and the consequent "glutting" of the market, thereby preventing the shore fisherman from disposing of his catch, of superior quality, at a reasonable price; that because of the low prices offered, and the virtual control of the Canadian markets by the companies operating steam-trawlers, the shore fishermen are deprived of an adequate livelihood, with the resultant serious depopulation of the fishing villages in recent years; and that if steam-trawlers are allowed to continue to operate from Maritime Provinces ports, the fishing villages in these parts will soon be deserted.

Of these objections, the first three may be grouped as relating to the general conservation of the fisheries; the next two, that is 4 and 5, as relating to direct protection of the fishermen; and the last two, that is 6 and 7, as relating to the serious economic problems involved. The first two objections based on the need for general conservation, may, we think, be briefly dismissed. Fishermen are doubtless sincere in their belief that steam-trawling destroys the spawn of cod and haddock. But the results of scientific investigation and observation do not support their belief. It has been found that the spawn of cod and haddock does not rest on the bottom but floats on or near the surface, out of reach of the trawler's net; the opinion that it is destroyed by the trawler seems, therefore, to be based on a misapprehension and is not in accordance with established scientific facts. On the question as to whether or not steam trawling is destructive of the feeding grounds of fish, there is a conflict of opinion, and obviously no definite conclusion can be reached. It seems reasonable to suppose that the dragging of the net, with its iron-shod doors, over the sea-bottom must,

to a certain extent, disturb the feeding grounds for a time. But it is equally reasonable to believe that the disturbance is only temporary, and that the ground is soon restored to normal conditions. It has been suggested that such temporary disturbances may prevent stagnation of the sea-bottom, and may in the end be beneficial to the feeding grounds. While we realize that these two objections are made earnestly and seriously by the shore fishermen and others, we feel that they may be dismissed as untenable, and as having little or no bearing on the merits of their particular case against steam-trawlers.

A more important objection, under the head of general conservation, is that the steam-trawler takes large quantities of immature fish, with resultant disastrous depletion of the fishing grounds. Investigations made in other countries give considerable support to this contention. Dr. T. W. Fulton, sometime Superintendent of Scientific Investigations in Scotland, concluded, after study extending over a reasonably long period, that about thirty per cent of the fish taken by steam-trawlers under his observation were immature fish. Evidence given in 1907 to a Royal Commission appointed by the British Government to enquire into the operations of steam-trawlers, showed that in January, March, April and May of that year approximately ten million, nine hundred thousand pounds of immature fish were landed at Grimsby. Statistics of nine landings at Halifax, N.S. from March 5 to March 14, 1928, by steam-trawlers operating for the National Fish Company, show that 245,803 pounds of "inedible fish" were landed and sent to the fish meal plant. The largest quantity of such fish in one landing was 85,000 pounds, and the smallest, 2,800 pounds. The quantity of immature fish, if any, included in this "inedible fish", was not stated.

Men who had fished on steam-trawlers told us that they had seen great quantities of immature fish washed dead through the scuppers after each fishing period. There seems to be little doubt that immature fish are taken by steam-trawlers in fairly large quantities. As a result of this, and of intensity of fishing, it is a reasonable conjecture that there will ultimately be a very serious depletion of the fisheries in the North Atlantic areas. It is said that from these causes the quantity of fish taken from the North Sea has greatly diminished in recent years. The landings of fish at ports in Great Britain kept up to a fairly average level until recent times. They now show a progressive decline. The supply to-day comes, however, not from the old fishing grounds but from new spaces. The area of the fishing grounds has been greatly widened each year, until from the North Sea, where they fished in former years in an area of 152,000 square miles, the steam-trawlers now fish from the White Sea on the north to the African coast on the south, and east to Iceland, in an area of over 700,000 square miles. The fisheries of the North Sea proper have greatly decreased; and in bringing about the marked diminution, the steam-trawler is regarded as one of the greatest contributory causes.

Under the second general heading of direct protection of the fishermen, two objections to steam-trawlers were expressed to us,—that the steam-trawlers are foreign-owned and foreign-manned, and that they destroy fishermen's gear without making restitution. With reference to the first of these protests, six of the ten trawlers now operating from ports in the Maritime Provinces are said to be owned in Canada; and the majority of the crews are said to be naturalized British citizens. This objection may therefore be considered as relatively unimportant. But the contention that steam-trawlers destroy the fishermen's gear was supported by well substantiated statements by many fishermen who themselves had suffered loss. At Lunenburg, N.S., the Captains' Association was represented before us by counsel who stated that the damage to gear of some of the Lunenburg fishing fleet by steam-trawlers amounted in recent years to at least

five thousand dollars. We were told by several fishermen that it is sometimes the practice of steam-trawlers to set their fishing course where other fishing vessels have taken up their position, and that they destroy, particularly during their night fishing operations, the gear that lies in the track of their trawl. In Great Britain, there have been many prosecutions of operators of steam-trawlers for such destruction of the gear of other fishermen and many convictions have resulted. There, however, the aggrieved fisherman may place his case, for equitable adjustment, before a general court specially established for this purpose. The Canadian shore fisherman has no such privilege; he has to depend on his own efforts to protect his rights and his property, and his efforts are usually futile. France, it is said, maintains a light cruiser or patrol-boat to enforce discipline among French steam-trawlers operating on the banks; and we were told that the Canadian hospital ship on these fishing grounds endeavours to provide protection for Canadian fishermen's gear. But the statements made to us by many fishermen indicate that the protection is far from adequate.

These five objections, pertaining to conservation of the fisheries, and to direct protection of the fishermen, constitute a problem the difficulties and intricacies of which are apparently not generally understood or wholly appreciated. With the possible exception of that relating to foreign-owned vessels, they are beyond the power of the Government of Canada alone to deal with, even if they were all valid or well founded. Beyond her territorial waters, Canada has no jurisdiction. The high seas are free to all nations as fishing grounds, and no country alone can prevent the steam-trawlers of other countries from operating there with their own methods and in their own way. The two important questions above, which call for consideration, are the taking of immature fish and the destruction of fishermen's gear. They are questions that can be disposed of solely by international negotiations and arrangements. We, therefore, recommend that an effort be made by the Government of Canada to bring about an international conference or negotiations among the nations from which steam-trawlers now operate on the fishing banks of the North Atlantic, with a view to making international arrangements or agreements for the regulating of all fishing vessels on the banks, particularly for the protection of fishermen's gear and for the more complete conservation of the fisheries in those areas. The desirability of such negotiations has frequently in the past been discussed and advocated, but no practical or definite plan has yet been formulated.

The final two objections, which we classify as constituting the serious economic problem involved in the entire discussion, are, in our judgment, the most important part of the whole difficulty, and are within the power of the Government of Canada to deal. While they are almost inseparably connected, the first is, in our opinion, relatively of less importance. It is alleged that the fish marketed from the steam-trawlers is an inferior product, which in the end injures the industry. Many of the statements made to us in support of this contention were, on the whole, impressive. It was pointed out that the fish landed by the steam-trawler is caught from one to six days before landing, while the fish landed by the shore fishermen is only a few hours from the water. We were told that the trawl takes into its great maw sharp stones and other flotsam and jetsam which bruise the fish, that when the huge net is raised out of the water into the air, the fish at the bottom of the bag are crushed by the great weight above, and that, therefore, only the upper portion of the catch can be classed as high-grade fish. We have had no opportunity ourselves of observing the actual conditions. But fish dealers who appeared before us in Montreal and Toronto stated that they preferred shore-caught fish to fish taken by steam-trawlers, and some of them declared that they would not purchase the latter if they could always obtain the former. At present, there is no branding of fish to indicate to the consumer the method by which it was caught; the consumer cannot dis-

criminate. Even if fish caught by steam-trawlers is on the whole inferior to that caught by shore fishermen, we are inclined to doubt if that fact greatly affects the consumption of fish, or if the industry is thereby injured. This objection therefore seems to us to have but a small bearing on the serious economic difficulties of the shore fishermen.

The final objection forms, in our opinion, the heart of the whole problem. It embraces over-production, the glutting of the market, low prices, a restricted market for shore fishermen, and the consequent depopulating of the fishing villages. It is an objection to which all the others are, in our judgment, secondary. Without reference to elaborate statistics of any kind, it is obvious that the shore fishermen of Nova Scotia are not paid enough for their products to give them the necessities of life. The phrase, "glutting" of the market, as used by fishermen, means rather the control of the market. A "glutted" market should mean lower prices to the consumer. But the consumer's prices of fish do not change materially, even when the product is abundant. According to the fishermen's statements, when there are large catches of fish, the companies operating steam-trawlers do not buy from the shore fishermen, or they buy at their own price, as a rule far below a reasonable return. They then make the surplus unsold fish into fillets, smoked or frozen, which are kept in storage for disposal when the supply begins to decline and the demand increases. In other words, they are said to control the market and the output to the market. The shore fishermen have received as low as 60 cents a hundred pounds for cod; and the usual price paid until within the last few months has been from one cent to one and three-quarter cents a pound for cod and haddock, depending upon the classification as "steak" or "market". Recently the price has reached two and a half to three cents a pound, but this is far in advance of the average price over a period of years. We were told by shore fishermen that the average cost of production is three-quarters of a cent a pound. As the fisherman has to sell, as a rule, in the cheapest market and buy in the dearest, and as the cost of the necessities of life in fishing villages, and of implements of production, have increased rather than declined, he feels that it is hopeless longer to remain in the industry at home, and he seeks similar employment elsewhere. As a result, the population of the counties in Nova Scotia, where fishing is carried on, has considerably declined in recent years. The following table shows the gradual decrease from over twenty-eight thousand in 1890 to about sixteen thousand in 1927, or a decrease of over forty per cent.

ROYAL COMMISSION ON FISHERIES

NUMBER OF FISHERMEN, NOVA SCOTIA, BY COUNTIES, 1890, 1897, 1911-12, AND 1917-27 INCLUSIVE

Counties	1890	1897	1911-12	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Richmond.....	3,052	2,635	1,972	1,753	1,916	2,173	1,328	1,766	1,838	1,471	1,289	1,435	1,375	1,374
Cape Breton.....	1,475	1,316	957	1,353	1,226	1,132	751	919	885	811	789	874	843	825
Victoria.....	3,034	1,365	914	1,024	1,051	1,137	1,325	1,389	1,367	1,319	1,136	1,128	1,069	1,028
Inverness.....	2,480	1,831	985	1,401	1,385	1,340	1,057	98	1,397	900	945	942	898	800
Cumberland.....	206	282	395	274	307	136	162	100	222	230	231	286	295	312
Colchester.....	125	279	84	198	176	222	101	94	70	103	92	72	74	70
Pictou.....	146	465	417	404	293	305	380	319	363	371	339	326	335	340
Antigonish.....	516	303	262	243	289	243	331	357	362	410	410	390	381	492
Guysboro.....	2,706	2,750	2,108	1,949	2,244	1,909	1,673	1,782	1,792	1,621	1,503	1,561	1,522	1,539
Halifax.....	3,528	3,415	2,397	2,156	2,099	2,606	1,732	1,938	2,058	1,734	1,760	1,718	1,621	1,706
Hants.....	141	77	90	110	73	85	66	60	56	49	46	43	51	55
Lunenburg.....	3,947	3,715	3,861	3,049	3,243	3,163	3,161	2,841	2,927	2,559	2,118	2,427	2,724	2,675
Queens.....	794	576	679	485	377	681	528	714	642	441	608	643	639	611
Shelburne.....	1,972	2,908	2,052	2,826	2,729	2,758	2,588	2,677	2,187	1,694	1,521	1,402	1,480	1,329
Yarmouth.....	1,995	1,806	1,651	1,724	1,543	1,560	1,553	1,475	1,380	1,137	1,097	1,088	1,108	1,076
Digby.....	1,090	1,104	1,827	2,004	2,067	2,001	1,777	1,415	1,502	1,466	1,478	1,488	1,460	1,460
Annapolis.....	397	409	745	560	537	427	314	323	308	304	326	326	367	330
Kings.....	140	137	265	115	142	145	138	142	139	122	117	117	103	105
Totals.....	28,224	25,373	21,661	21,767	21,598	22,083	18,965	19,292	19,495	16,742	15,805	16,266	16,315	16,127

We were told that the number of boats employed in many places had greatly decreased in number. While the figures given to us in specific localities cannot always be accepted as accurate, there is abundant proof of decline in boats, small vessels, equipment and population. There is ample evidence, too, that young men are not entering the shore fishing industry in large numbers. This is doubtless because of its lack of promise of an adequate livelihood rather than because of its lack of inducement as a calling; although hazardous, in itself it should be an attractive pursuit which offers independence in labour, and which, under more favourable conditions, should yield a fairly large return for the labour and capital invested, compared with other industries. A remedy must therefore be speedily found, and the remedy should be prompt and drastic. In default of a remedy, it is not improbable that the fishing villages of the Maritime Provinces may soon be even more seriously depopulated.

The problem seems to be largely one of choice between the steam-trawler and the shore-fisherman. One or the other must remain, and one of the other must go. There would seem to us to be no other alternative. It must not be forgotten that the shore fishermen are proprietors of the inshore sea, proprietors not in virtue of actual possession, but in having made it their own from the earliest days of Canadian coast settlement or colonization. They are almost wholly the descendants of Canadian pioneers, and they follow their fathers' and their ancestors' calling. They have built up, along the coast, communities most valuable to the nation and worth every effort to preserve. And in so doing they have been assisted generously but justly by public funds in the construction of wharves and harbours and general aids to navigation, which might help them in their labour and make their calling easier and happier. Healthy and contented fishing villages are vitally necessary on the Atlantic coast of Canada, but they can only survive with the independence that goes with security of markets. It is perhaps needless to emphasize the prime importance of having around the coast a body of men of the type of the fishermen of the Maritime Provinces, and more especially of Nova Scotia, and of fostering them by every possible means. The maintenance of such communities would seem to be necessary, even if the fisheries of the Maritime Provinces had lost their economic value,—which is far from being a fact, as their value in 1926 was approximately twenty million dollars. To-day the population of these villages is not only seriously declining, but it is viewing its future with dissatisfaction and discontent. The young men are not replacing the older generation, and the situation must be regarded from a national viewpoint with grave anxiety and apprehension. Under the economic disabilities of the past few years, it is perhaps surprising that the decline has not been even greater. It will be impossible to recreate such communities if they are allowed to die out. When once destroyed, they can never be supplied. They are not yet dead; they are waiting their chance to succeed; it is not too late to revive them; and the present would seem to be an opportune time to take decisive action.

It is alleged that the steam-trawler, with its vast mass production, has forced the shore fishermen out of his customary rights and has deprived him of a market, other than at an unremunerative price. The Canadian market for fresh fish was established and developed by various means. The Government of Canada greatly assisted its development in 1908 by paying a portion of the express rates in the transportation of fresh fish from the Maritime Provinces to other parts of Canada. Later, refrigerator cars and more rapid transit helped to enlarge this market. The "meatless days" of the war years, and the operating of special "fish-trains", also increased the consumption of fish. When the so-called Fordney Tariff was levied in the United States, it was necessary to seek a home market to take the place of the market at which the new tariff barriers were erected. All these agencies aided in creating and developing a

home market for fresh fish. But this entire home market, as pointed out in Paragraph III, Section 7 of the main report takes to-day only ninety million pounds of fresh fish in all forms from the Maritime Provinces. The companies operating steam-trawlers state that of the seventy-six million pounds handled by them last year, thirty-six million pounds were purchased from shore fishermen. The following table, furnished by these companies, indicates the relative production in pounds:—

	1923-24	1924-25	1925-26	1926-27
Trawler landings.....	20,841,586	24,926,194	34,066,495	40,292,911
Purchased from shore fishermen.....	29,732,596	32,775,658	31,399,518	36,365,021

From this table it appears that the quantity of fish purchased from the shore fishermen increased in four years only slightly over six million pounds, or 22 per cent, while the quantity purchased from steam-trawlers or procured by steam-trawlers increased over nineteen million pounds or approximately 94 per cent. The total quantity of fresh fish shipped by the companies operating steam-trawlers increased over twenty-six million pounds or 52 per cent. The shore fisherman did not profit to a relatively great extent from this increased consumption of fresh fish. That under present conditions the shore fisherman's fears for the future are not unfounded, is indicated by a consideration of the present market supply and demand in Canada. As already stated in Paragraph III, Section 7, of the main report, the total consumption of fresh fish from the Maritime Provinces in Canadian markets is ninety million pounds. The average catch each trip by a steam-trawler is, at a conservative estimate, not less than 150,000 pounds, probably 175,000. Statistics from the National Fish Company, already quoted, show that in ten days, from March 5th, to March 14th, 1928, over a million and a half pounds of fish were landed by their trawlers. The average number of trips a month by a steam-trawler is five or six. Based on the lower estimate of five, and the lower estimate of 150,000 pounds of fish landed each trip, a steam-trawler would land at least 750,000 pounds a month, or nine million pounds a year. The ten steam-trawlers now operating from Nova Scotia ports would land much more than ninety million pounds, which is the total consumption of fresh fish in Canada from the Maritime Provinces. If steam-trawlers are used to full capacity, there is, therefore, little promise of markets for the shore fishermen, under present conditions, for as consumption increases, steam-trawlers will doubtless increase. The shore fisherman, deprived in a large measure of his home market, is compelled, at greatly increased labour, to dry or salt his fish and ship it to a foreign market. But the demand for dried fish is decreasing, and that market, once profitable, now holds out but little encouragement. Thus, over-production is said to be depriving the shore fisherman of a livelihood and to be forcing him to leave his country. The captain of a steam-trawler told us that from a catch of four hundred thousand pounds, of edible fish, he had seen ninety per cent sent to the fish meal plant, because of an over-stocked market, and a lack of demand. Efforts must be made to retain in their calling the fishermen of the fishing villages of the Maritime Provinces. In addition to encouraging an increased immigration to Canada, it is obvious that every assistance should be given to keeping the population of the fishing communities in their own country by providing adequate care for their industry.

We believe that one of the remedies for the present situation is the total prohibition of steam-trawlers from operating from Canadian ports, landing

their catch in Canadian ports, or obtaining in Canadian ports coal or supplies. And we recommend that such legislation be enacted as to make such prohibition effective on and after June 1st, 1929.

Statements in support of steam trawlers were made to us, largely by persons interested in the operation of these vessels. It was suggested that steam trawling is a scientific method of catching fish, that modern methods in any industry have always met with opposition, and that the trend of employment from one industry to another is a common trend,—hence the decline in the population of the fishing communities in the Maritime Provinces. Analogies were made with farm tractors which took the place of horses, harvesting machinery which replaced the sickle and the scythe, textile factories which succeeded the spinning-jenny and the loom. We were not impressed with the soundness of these analogies; they are, however, so misleading that we feel disposed briefly to refer to them. Labour saving farm machinery is of advantage to the individual, who is entitled to introduce on his own property any method devised to benefit himself, so long as it does not injure his neighbours or his community; but a machine, the operation of which, while bringing benefit to the individual, would result in sending his neighbours to another land, and in making a depopulated or discontented community, would not long be tolerated. In the analogy of the textile factory, there is obviously confusion between the method of producing a raw material and the method of fabricating a raw material. The spinning-jenny has gone; but the wool growers, the producers of the raw material, still have strong and prosperous co-operative associations.

Steam-trawling, in its operations, is not analogous to any other industry. In other industries, so-called improved methods are usually of advantage to the whole communities where they operate; and they provide, as a rule, employment in another form for labourers left unemployed because of the introduction of the improvement. But steam-trawling does not produce employment to absorb the shore fishermen displaced from labour and deprived thereby of an adequate livelihood. The crews of the ten steam-trawlers operating from the Maritime Provinces number only about two hundred men. It is the function of industry in any country to produce men as well as goods, to make livelihoods as well as profits. We venture to say that, in our judgment, the only practical and reliable test than can be applied to any industry, particularly an industry which makes free use of a natural resource, is not merely its profits, or its power to supply a market, or even its value to the consumer, but rather its total effect in the general prosperity and contentment of the population of the country where its operations are carried on, and among the workmen on whose realm it encroaches. Judged by these tests, steam-trawlers operating from Canadian ports seem to us to have no claim to privilege or tolerance, particularly in the present circumstances in the Maritime Provinces. A change of employment is possible in countries of large population and of vast and diverse industries. It is not possible to-day to fishermen in the Maritime Provinces, where few industries exist. Either the shore fisherman must be kept contented in his calling, with a secure market and a reasonable reward for his labour, or he must leave his country; many have already left it and are now leaving it. Again, a change from the fishing industry is more difficult than from other industries. The fisherman is born and bred to the sea, with an inherent aptitude for the sea and ships and boats. The very nature of his training largely unfits him for happiness or success in any other calling.

We were told that a large amount of capital had been invested by the companies operating steam-trawlers and that, therefore, they should not be interfered with. The prohibiting of steam-trawlers need not necessarily interfere with the trading operations of the companies now operating them. It will merely necessitate, as already stated, larger purchases from the shore fishermen.

The companies operating steam-trawlers shipped last year over seventy-six million pounds of fresh fish in varied forms to the Canadian markets. Of that quantity, they purchased over thirty-six million pounds from shore fishermen, while over forty million pounds were taken by steam-trawlers. If steam-trawlers are prohibited, an equivalent amount of the catch formerly taken by them must be taken by shore fishermen. It will mean merely a change in the source of supply.

The following table, from statistics for 1926, gives the relative amounts invested by companies operating steam-trawlers, and by fishermen and dealers and others engaged in the industry; also the relative number of men employed, and the approximate amounts invested in wharves and other necessities of the shore fisheries. We do not feel called on to comment further on this information:—

Total amount invested in steam trawlers	\$	990,000	00
Invested in steam fishing vessels	\$	159,500	
" sailing and gasoline vessels		6,454,422	
" sail and row boats		615,936	
" gasoline boats		5,328,186	
" carrying smacks and scows		516,783	
" Vessels, trawls and hand lines		420,695	
Total		13,495,522	00
Invested in fishing piers and wharves	\$	977,820	
" freezers and ice houses		448,401	
" small fish and smoke houses		1,026,824	
Total		2,453,045	00
Invested in nets, traps and weirs		5,112,149	00
" crab-traps, oyster plants, and lobster traps		1,971,658	00
Total of	\$	24,022,374	00
Men employed on steam trawlers		249	
" vessels		7,660	
" boats		40,122	
" carrying smacks		737	
		48,519	

It was stated to us that if steam-trawlers are prohibited from landing their catch in Canadian ports, the shore fishermen are at present incapable of supplying the market for fresh fish, and that the market will be lost beyond recovery before they are sufficiently equipped to supply it. We were also told, that in certain months of the year, the shore fishermen will find it impossible to meet the demand for fish, and that the consumer will therefore suffer. Such predictions are extremely problematical and speculative; yet we venture to hazard the opinion that they will not be fulfilled. An industry cannot fairly consider only the interests of the consumer and be unmindful of the welfare of the persons engaged in it. The supply of food commodities is seldom constant or regular. A food product is frequently unobtainable, but its market is seldom lost. So tangled are all the factors concerned, that it is not possible to get accurate statistics of production by the two methods of fishing, or of actual consumption. But we are convinced that there is to-day much unused capacity in the shore fishing industry, as a natural result of the economic disadvantages under which it has a long time laboured. We must, therefore, distinguish between actual strength and potential strength, and take into consideration the latent power of the fishermen. The steam-trawler has, we believe, displaced labour capable of supplying the demand. That production by shore fishermen can, at times, be vastly increased is evident from the following table showing the quantities of fresh cod and haddock shipped from the Maritime Provinces from 1900 to 1907, the year before the first steam-trawler operated from a Maritime Province port. It indicates that the production increased in eight years from seven million pounds to over twenty-two million pounds.

Year	Cod	Haddock
	Fresh or Green	Fresh and Smoked
	Lbs.	Lbs.
1900.....	Nil	7,500,625
1901.....	Nil	8,691,669
1902.....	Nil	7,751,883
1903.....	504,500	10,060,283
1904.....	1,238,985	9,875,700
1905.....	1,876,000	14,216,384
1906.....	2,170,695	18,246,866
1907-08.....	6,895,900	15,259,535

At present the fisherman who cannot sell his fish at a reasonable price is compelled to salt it or dry it, and to sell it in a foreign market, while his home market for fresh fish is closed to him because of the production by steam-trawlers. Last year the production of dried fish in the Maritime Provinces amounted to over one hundred million pounds. A large proportion of this fish could be diverted to fresh fish markets. With the introduction of brine-freezing, referred to in Paragraph X of the main report, and with co-operation referred to in Paragraph XIV, it should be possible for the shore fishermen to supply all demands in periods of lean catches resulting from scarcity or storm. Even in winter months the production of fish by shore fishermen is not inconsiderable. With the introduction of more motor power, fishing vessels will land their catches more frequently. It is possible that it will be necessary for the shore fishermen to improve their methods of fishing, by the introduction of more modern gear, such as the small Danish seine or trawl. The fishermen who appeared before us expressed emphatic confidence in their ability to supply the demand, and we feel that with adequate encouragement they will not fail to keep the market supplied.

The following table gives in pounds the catch in western Nova Scotia by shore fishermen during the winter months of 1927.—

LUNENBURG COUNTY

1927 January	Cod	166,000	Haddock	250,000
February.....	"	75,000	"	145,000
March	"	210,000	"	206,000

QUEENS COUNTY

1927 January	Cod	146,100	Haddock	97,400
February	"	90,800	"	5,000
March.....	"	38,000	"	11,800

SHELBURNE COUNTY

1927 January	Cod	338,300	Haddock	245,000
February	"	272,000	"	166,000
March	"	164,000	"	62,000

DIGBY COUNTY

1927 January	Cod	77,900	Haddock	177,200
February	"	3,900	"	11,400

The year 1927 was the first year in which winter fishing was carried on from Lunenburg. The catch in Shelburne and Queens County in that year was much smaller than the average, as the fishermen had reduced their fleet and curtailed their catch because of over-production in the previous year.

With a mounting density of population and a much larger consumption of fish, it is possible that in some future time steam-trawlers may be required in

Canada to meet the demands of a large fish consuming population. But that time seems to us to be very far distant. And meanwhile, steam-trawlers should in our judgment, without fear of the consequence, be prohibited from landing their fish and from obtaining supplies at Canadian ports, in order that the fishing population of the Maritime Provinces may be protected and retained.

During the course of our enquiry we heard from many reliable and restrained persons in almost every centre we visited, detailed descriptions of conditions in many districts along the coast of the Maritime Provinces. We were given vivid word-pictures of fishing villages in which ageing men alone were left to man the fishing boats, with little hope of adequate livelihood in the future years of their physical incapacity, and no hope of pension such as is possible to workers in other industries; of fishing communities from which the young men had emigrated in large numbers to another land, or were hoping to emigrate when they could gather sufficient means; of neglected boats with hulls ripe and rotten on the beach; of discarded gear once valuable and useful, but now falling to decay; of abandoned fishing vessels, left hopefully equipped as they came in from the sea, to wait for a better season which never came; of wharves and breakwaters once staunch and busy, but now dilapidated and deserted; of once prosperous localities slowly but surely becoming the graveyards of a dead industry; of fisher-folk despondent and disheartened, struggling on against economic disabilities, eager to labour in one of the most hazardous of pursuits but unable to sell their products for a reasonable reward, always hoping for better luck, and clinging grimly and patiently to their calling,—a tribute at once to their character and their courage; and of school-children psychologically distrustful of a future in their own country and planning to migrate at maturity to another land to make a living. Apart from the statements made to us, we have taken every means and every opportunity to inform ourselves on the actual conditions, and we are convinced that these word-pictures were not overdrawn. Our own independent observation has left on our minds an impression of the seriousness of the situation deeper perhaps than that left by the emphatic and, at times, indignant protests of fishermen smarting under their obvious disabilities. But we believe that with necessary regulations and encouragement these conditions are remediable, and that they can give place to conditions of adequate livelihood and contentment. But immediate action is necessary to bring about this result, if the fishing communities of the Maritime Provinces are to be retained, by ensuring to the fishing population adequate remuneration for its labour.

CYRUS MACMILLAN,
H. R. L. BILL,
JOSEPH MOMBOURQUETTE,
J. G. ROBICHAUD.

XVIII

STEAM-TRAWLERS

REPORT 2

One of the most difficult matters referred to the Commission for inquiry, and one which occasioned a deep and widespread interest among fishermen of certain parts and of certain branches of the fishing industry, was whether or not further restrictions should be imposed upon the operation of steam-trawlers fishing out of Canadian ports.

Representations were made to the Commission suggesting restrictions or regulations to be made applicable to trawlers fishing out of Canadian ports in addition to those now in force; many others were made to the effect that traw-

lers should be entirely prohibited from fishing out of Canadian ports. They are not permitted now to fish in territorial waters. My colleagues are recommending the prohibition of the use of the trawler as a Canadian fishing vessel, out of Canadian ports, and with that I am unable to agree. I am therefore obliged to submit separately my report upon this matter.

Various objections were urged against the use of the trawler for fishing purposes. It was said that it destroyed the spawn of cod and haddock; that it destroyed the feeding grounds of these fishes; that it was depleting the stock of fish in the sea; that it destroyed large quantities of immature fish; that it has decreased the supply of cod and haddock on the shore fishing grounds; that it produced an inferior fish for food supply; that periodically it caused overproduction and a decline in market prices, and, that it frequently damaged or destroyed the fishing gear of fishermen on the fishing grounds. Another class of objection was, that some of the trawlers in use were chartered from abroad, and should be regarded as foreign trawlers, and should not be permitted to fish from Canadian ports, as Canadian fishing vessels.

Additional restrictions or regulations suggested in respect of the operations of trawlers were, that they be not permitted to fish during the spawning season; that the trawler should pay a license fee; that a tariff should be imposed on all trawler-caught fish entering Canada; that a duty of 1 cent per pound should be imposed on trawler fish unless a one-half interest in the trawler was owned in Canada; that trawler fish should be identified in the market by a mark; that trawlers be permitted to fish only in winter months; that they report back to port on the fourth day after each sailing; and that they be prohibited from fishing in the Northumberland Straits and certain other waters.

It is correct to say that more persons appearing before the Commission spoke against the continued use of the trawler than did others to the contrary, particularly considering that many fishermen spoke in a representative capacity. That, however, is not conclusive of public opinion, or even of those engaged in the fishing industry; that opinion is difficult of ascertainment. The statements made to the Commission must be carefully weighed and accorded their proper value by the usual tests; and being largely statements of opinion, their weight cannot be determined by a count of numbers. If the reasons advanced for the prohibition of the trawler are of doubtful foundation in fact, then it may fairly be said that existing public policy respecting the use of trawlers should not be lightly reversed, after its acceptance for fifteen years. To do so, upon fears that perhaps are foundationless, upon expectations that may fail of realization, or upon opinions which may not be well founded, is not sufficient; nor would it be calculated to effect a permanent settlement of this highly controversial matter. A decision to prohibit the use of the trawler for fishing purposes by Canadians, should be beyond reasonable doubt, before it is reached. Before trawler fishing, now no longer in its infancy, is terminated, the reasons for so doing should be manifestly strong. If the prohibition of the trawler is a mistaken policy, it may cause injury to those whom it is expected to benefit, as well as to others, and to retrieve the consequence of such a mistake may be most difficult.

It is difficult to determine the value that should be attached to the representations made to the Commission, concerning the prohibition of the trawler. Many statements suggesting prohibition of the trawler were made, but not always unqualifiedly made. Frequently they were associated with alternative suggestions in the way of further regulation of the trawler. For example, a series of recommendations was presented to the Commission, on behalf of the fishermen of a large fishing centre, Riverport, N.S., and one was "prohibition or curtailment of beam or otter trawling and that a duty be enforced on all fish landed from beam trawlers other than Canadian registry." It was explained

that this was not intended to mean the prohibition of Canadian trawlers. Frequently the prohibition of the trawler was suggested, unaccompanied by any reasons whatever; and often on obviously fallacious grounds, which left the suggestion without weight. Opinion upon the subject varied in localities. In Prince Edward Island, the only representation made to the Commission was, that trawler fishing in the Straits of Northumberland should be prohibited; the prohibition of trawler fishing in international waters was not suggested. None of those appearing before the Commission from the Magdalen Islands suggested the prohibition of trawler fishing. In New Brunswick, little criticism was directed against the trawler, and little was said in its favour. One person thought trawlers were necessary at certain seasons of the year; another, that a fleet of deep-sea trawlers should be operated from the port of St. John; and another, that a tariff should be imposed on fish landed by trawlers. A few persons stated that the use of trawlers should be prohibited but without giving any weighty reasons for their opinions. Coming then to Nova Scotia, the situation was found to be quite different; and the whole controversy concerning the use of trawlers, in reality, relates to and is confined to that province. There, in certain localities particularly, a strong sentiment was found among fishermen in favour of the prohibition of the trawler; in other parts there did not appear to be any substantial body of opinion against its use. The opinion that the elimination of the trawler would not be prudent or practical was frequently expressed, while others suggested the application of further restrictions upon trawler fishing. In the large fishing district of Lunenburg County, only one person, I think, appeared before the Commission unqualifiedly suggesting the prohibition of the trawler; this person spoke on behalf of others as well. It was quite apparent in this great fishing centre that there was no substantial opinion in favour of the prohibition of the trawler. This was in distinct contrast with former years. In 1912, when trawlers were coming into use in Nova Scotia, a large public meeting was convened at Lunenburg for the express purpose of considering this question; in a resolution passed by this meeting it was declared that the fishing industry would be extinguished if trawler fishing was permitted to continue. When the Commission was at Lunenburg, a dragger trawler was under construction, to engage in fishing from that port; it is probably now in use. One could not refrain from hearing the opinion frequently expressed, that many others would follow. The main objection heard at Lunenburg against the trawler was that at times it damaged the fishing gear of vessels on the fishing banks; and it was urged that regulation by international agreement was necessary to prevent or minimize this. Lockeport is one of the largest fresh fish producing ports in Nova Scotia, other than ports from which trawlers operate. It is one of the few places in Nova Scotia where shore fishing is carried on throughout the year by boats and vessels, except when prevented by unfavourable weather conditions, chiefly during winter months. The Commission was addressed at Lockeport by Mr. Winthrop Bell, who was selected by a meeting of Lockeport fishermen, to present their considered views. He said that trawler fishing should be confined to Canadian-built and owned bottoms, but did not suggest the prohibition of the trawler. It is only fair to say that opinions supporting the prohibition of trawlers were also given to the Commission at Lockeport. The master of the largest vessel fishing out of Lockeport stated that trawlers were probably needed and that fresh fish market requirements could not be supplied by boats or vessels alone. He said, however, that there were too many trawlers engaged in fishing; that they should be registered and owned in Canada; and that they should pay taxes in Canada, and if so, he added, the fishermen of Lockeport would take their chances with trawlers. A fish merchant carrying on an extensive fresh fish business at Lockeport, stated that trawlers should not be permitted to operate from Nova Scotia ports unless they were constructed and owned in Canada. He also stated that it would not be wise

to prohibit trawlers. All this is not indicative of a definite preponderance of considered opinion in favour of the prohibition of trawlers. The great number of suggestions made in the way of further regulation of the trawler, even by those speaking in support of its prohibition, was expressive of honest doubt as to the proper means of solving what they considered a perplexing problem.

The trawler now generally in use throughout the world is known as the "otter" trawler and not the "beam" trawler. The otter trawl consists of a large cone-shaped net with a mouth ranging from forty to ninety feet according to the size of the trawler. The mouth of the net is kept open when trawling by an otter board affixed to the wings at each side of the mouth of the net, and to these boards the wire towing-warps are attached. For present purposes this sufficiently describes the method of fishing employed by trawlers.

About 1900, the first trawler was operated from a Nova Scotia port, followed by another in 1909. Neither continued long in fishing there. Each year since 1911 one or more trawlers have fished out of Nova Scotia ports, and until recently during the winter months only. The number said to be in operation during parts of each year since 1911 was as follows: two in 1911; two in 1912; four in 1913; six in 1914; four in 1915; four in 1916; seven in 1917; five in 1918; six in 1919; eight in 1920; five in 1921; five in 1922; seven in 1923; eight in 1924; ten in 1925; eleven in 1926, and ten in 1927. In 1927, four of the number mentioned were operated by the National Fish Company of Halifax, N.S., two being owned by that company and of Canadian registry, the remaining two being owned by Nova Scotia companies, the share capital of which was held there, and chartered to the National Fish Company. These trawlers were registered in Great Britain until recently, when they were transferred to Canadian registry. A fifth trawler, owned and registered in Newfoundland, was also under charter to the National Fish Company. In 1927, the Maritime Fish Corporation operated three trawlers, one of which it owned, the other two being under charter from British owners. The Leonard Fisheries, Ltd., in 1927, owned and operated one trawler; another, the "Offa", of British registry, was operated in its interest under an agreement, the terms of which may be briefly stated. The trawler "Offa" was engaged in fishing from Nova Scotia ports under an agreement between the Leonard Fisheries, Ltd., and one Martin Olsen representing the owners, for the period from October 1st, 1927, to April 15th, 1928, the fish being purchased by the former in stipulated quantities and at agreed prices.

Fish caught by trawlers chartered to Canadian companies from British owners, have been admitted free of duty into Canada. Section 9 of the Customs Tariff Act, 1907, states: "that fish caught by fishermen in Canadian fishing vessels shall be admitted into Canada free of duty", and it is complained that chartered trawlers are not "Canadian fishing vessels", within the spirit of the Customs Tariff Act. The Department of Justice in 1920 gave the opinion that "Canadian fishing vessels" should be construed to include a British registered steam trawler under charter to a Canadian corporation. In pursuance of this opinion, trawlers of British registry chartered to Canadians, have been treated as Canadian fishing vessels, and therefore entitled to land their fish free of duty.

The principal grounds of complaint against the use of the trawler for fishing purposes may now be considered. The first to be mentioned is, that trawler fishing will deplete the stock of cod and haddock on the fishing grounds, because it destroys the spawn of these fish. This ground honestly influences a great number of persons against the use of the trawler. It is mentioned, not because it is of weight, but because this opinion seems to be widely held, notwithstanding the conclusive scientific evidence to the contrary. Professor J. N. Gowanloch, of Dalhousie University, stated to the Commission that the spawn of cod and haddock floats near the surface and therefore could not be dragged from the bottom by the trawler. Dr. A. G. Huntsman of the Biological Board supported

this opinion. A Royal Commission was appointed in Great Britain in 1883, to enquire into the complaints of fishermen against the use of the beam trawler. During a period of eight months, observations were carried on by scientific men on behalf of that Commission, upon the effect of the use of the beam trawl-net. In 1885 the Commission reported, finding that the beam trawl did not destroy cod or haddock spawn. In 1912, the Congress of the United States directed an enquiry by the Commissioner of Fisheries into the methods of fishing, by beam or otter trawler. The enquiry was made under the direction of a Committee, some of whom were scientific men. Observations were made on fishing vessels by some members of the Committee, and also by a number of others selected for the purpose and covering quite a period of time. They reached the conclusion that otter trawls did not destroy the spawn of the commercially important demersal fishes, such as cod and haddock, all of which have pelagic or floating eggs.

It is beyond controversy, that the spawn of cod and haddock and most commercial fishes, float in the sea near the surface, and are not subject to destruction by the trawler method of fishing, except when the spawning fish is taken, and this would occur under any other method of taking fish. This contention, as a ground for the prohibition or curtailment of trawler fishing is, therefore, without foundation.

Another ground urged against the use of the trawler is that it destroys quantities of immature fish, which if permitted to live would not only increase in size and thereby add to the volume of fish in the sea, but by procreation would further increase the stock of fish. On this point the British Commission reported that the evidence given by fishermen and trawlers was very conflicting. The fishermen asserted the quantity of immature fish taken in the trawl to be very large, and far in excess of anything observed by Professor McIntosh, Scientific Adviser to that Commission, who, after lengthy observations, expressed the opinion that while at times numbers of immature fish may be brought up by the trawl net, these generally speaking were not of the more valuable kinds of food fishes; and that there was no evidence of any unnecessary or wasteful destruction of immature food fishes by the beam trawl. The Committee assisting the Commissioner of Fisheries of the United States in the enquiry there, was of the opinion, that while the trawler was more destructive to young fish than trawl line fishing, yet a large proportion of such fish would die or be destroyed by natural causes before reaching a large or medium size, and that the effect of the destruction of young fish taken by trawlers upon the total supply of fish, would be less than the statistical data before them would indicate.

On the evidence available to the Commission, it is impossible to state what proportion of fish taken by trawlers are immature. To gather this information with any degree of accuracy would require observations covering a substantial period of time. Mr. E. Kelly, a Special Inspector of fresh fish landed from trawlers at Canso, N.S., has furnished some evidence as to the proportion of small fish landed by trawlers. Three trawlers fishing out of Canso from November 7th, 1927, to February 29th, 1928, landed 3,009,280 pounds of fish, of which quantity there was 177,685 pounds of small fish, all of which were marketable. The Commission caused examination to be made by two departmental fishery officers, of the landings of fish by several trawlers at Halifax, during the month of March last. These fishery officers reported to the Commission upon the proportion of immature fish found in twelve landings by different trawlers. In one landing the small edible fish was 2.86 per cent; in another, .78 per cent; in another, .66 per cent; in another, 1.11 per cent; in another, .53 per cent; in another, 1.21 per cent; in another, .51 per cent; in another, .61 per cent, while in two cases there were no small fish at all. The small edible fish were marketed as serod. The trawlers referred to were operated by the Leonard Fisheries, Ltd., and the National Fish Company, Ltd. From this report, it will be

seen that the proportion of immature fish landed was comparatively small. This however may not be conclusive, because at other seasons of the year a much greater proportion of small fish might be taken, and it is also possible that some were thrown overboard at sea by some of the trawlers.

The effect of the taking of immature fish by trawlers, upon the stock of fish in the sea, is impossible to state, and any consideration of the probabilities would be purely speculative. Immature fish are continuously being preyed upon by other fish, such as the dogfish and many others; they are caught by trawl line fishermen; any attempt to estimate the quantity thus destroyed would again be mere speculation. The evidence available to the Commission does not establish any alarming or wasteful destruction of immature fish by the trawler, or that the supply of fish is thereby diminishing. A prohibition of the use of the trawler upon this ground would not seem justifiable, particularly, if only Canadian trawlers are to be prohibited.

Another ground of complaint against the further use of the trawler, was, that it destroyed the marine animal and vegetable growths which are found on the bottom of the fishing grounds, and upon which fishes feed. Should there be any established basis for this view, it would constitute a strong case against the use of trawlers. Although the cod and haddock spawn on some of the fishing banks, they resort to them primarily for food, and it would follow that if the bottom growth were destroyed, the productiveness of the fishing banks would in time, be seriously impaired. It is necessary, therefore, to enquire, if there is evidence anywhere to be found in support of this contention.

The evidence presented to the Commission on this point was not the result of special investigation or study, but was of inference only. It was not conceived to be the duty of the Commission to carry on any scientific investigation upon this point, and it is not probable that this was expected of it. In the circumstances, one cannot do more than look to other sources for light upon the point, such as the result of investigations into the same subject matter in other countries. The report of the United States Commissioner of Fisheries, already mentioned, discusses this point quite exhaustively, and I feel justified in quoting, briefly, from it. That report upon this point, in part states:—

“Much of the data submitted by the observers are too vague for quantitative consideration, but one man definitely states the quantities in bushels in his monthly analysis of the results of his observation on each bank. From his returns it is deduced that the average quantity of scallops, clams, shells, sponges, starfishes, and bottom material generally, varied with the month and the locality, from a small fraction of a bushel to 4.7 bushels per haul, the latter being the average of 26 hauls made in South Channel in August, 1913.

“A simple computation shows that this maximum represents a film 0.00024 inch in thickness spread over the area swept by the trawl, or, to state the case in another way, a little pile of material 1 foot square and 9 inches high on each acre traversed. This means either that a small proportion of the existing bottom material was captured by the net, which is probable, or that there was very little material to take. In either case the result to the fishery is trivial and negligible, as the whole quantity, shells and all, if eaten by the marketable haddock and cod alone taken in the same hauls would constitute a morsel of but about $2\frac{1}{2}$ cubic inches for each—a very small meal indeed—and leave nothing for the many other fishes taken at the same time.

“But, the evidence shows, this material was not destroyed but thrown overboard when the decks were cleared after each haul, the uninjured organisms in large part to carry on their lives as before, and the dead shells to lie again on the bottom and serve as places for attachment for other growths. Any crushed scallops, mussels, etc., undoubtedly would be eaten by fishes or by animals on which the fishes feed, for no dead organic matter is permitted to lie long unutilized on the floor of the sea. Fragments of sponges would each begin to grow into a new sponge and mutilated starfishes would soon reproduce the injured or lost parts, if they did not fall prey to the fishes in the meantime. The modicum of captured and liberated material would therefore be little, if any diverted from the function which it would have discharged if it had remained unmolested on the bottom. It is claimed, however, that but part of the damage wrought to the bottom by the trawls is represented by the material brought up in the nets, greater quantities of the bottom organisms being torn loose, crushed and mutilated. To the extent that this may be true, the preceding remarks

on the utilization of the detached and injured organisms also apply. It is, of course, impossible to observe the action of trawls operated in depths as great as are found in the bank fisheries, but by an examination of the catch, the method of operating the apparatus, and comparison with the known effects of similar appliances, conclusions of some value may be deduced."

A finding of the report was, that other trawlers did not seriously disturb the bottom over which they fished, or materially denude it of the organisms which directly or indirectly serve as food for commercial fishes.

Upon the question of injury to the feeding grounds of fish by trawlers, the British Commission of 1885, already referred to, stated:—

"Complaints were occasionally made to us that the head irons and ground rope of the trawl tear up the bottom of the sea and cause great injury to the invertebrates and the bottom fauna inhabiting the banks where the fish feed. This assertion was not supported by any more definite facts than the occasional presence of these creatures in the trawl net. In the absence of any satisfactory evidence either for or against the view thus presented us, we have to rely on the observations of Professor McIntosh, which lead us to believe that the injury done is insignificant."

Professor McIntosh, scientific adviser to the British Commission, was of the opinion that a certain amount of damage was inflicted by the trawl on the invertebrate inhabitants of the fishing grounds, but the nature of the fauna and their surroundings were such that any injury occurred rather in the net and on the deck of the vessel than on the sea bed, and he stated that no evidence had been obtained that fish would not frequent a bank that had been trawled over. He said it was probable where this had occurred, that it was due to other causes.

The contention that the trawler materially injures or destroys the food of fishes on the fishing grounds, is not supported by any evidence given to the Commission, or by any elsewhere available. In any event, to prohibit Canadian trawlers alone would not substantially prevent the injury, if injury there be.

Again, in general terms, it was contended that the trawler was depleting the stock of cod and haddock on the fishing grounds. If this be correct, the result should in some degree be reflected in the quantities of fish annually taken on the fishing grounds frequented by trawlers. There is nothing to indicate that the effect of trawler fishing, up to the present time, has been to diminish the stock of cod and haddock. There always have been variations in the annual catch of these fish on the North Atlantic fishing grounds, as elsewhere. There are good and bad fishing years in the sea, as there are good and bad harvests on the land. Scientific investigations have not yet been made with sufficient care, to define the exact causes of variations in the abundance of fish on the various fishing grounds.

Statistics indicate that the combined catches of trawlers and fishing vessels from Canada, United States, Newfoundland, France and Portugal, on the fishing grounds of the North Atlantic, are not diminishing. In 1925 the combined catch by fishermen of the countries mentioned, was greater than in any one other year for which statistics are available. In 1927, the Lunenburg bank fleet of 84 vessels caught 239,375 quintals of fish, and while this was considerably short of the preceding year with 89 vessels, nevertheless it was greater than any other year in the history of that fishing fleet, prior to 1918.

In respect of the cod and haddock shore fisheries, we also find variations in the annual catch, particularly in certain localities. The decline in the abundance of shore fish such as cod and haddock, in certain sections of the coast, was attributed by some to trawlers. In some years, and sometimes for a period of years, the cod or haddock will disappear from fishing grounds where for a considerable period they were found with regularity and in substantial abundance. All the physical and biological factors influencing the distribution, movements and relative abundance of shore fish are not yet scientifically determined, but it is known that they are influenced by ocean

currents and temperatures. Fishery statistics do not indicate that the shore fisheries of the Maritime Provinces are diminishing in supply, though of course, variations in abundance are shown. In 1925, 1926 and 1927, the yield of the shore fisheries was greater than in preceding years. A decline in the catch of shore fish in some parts is quite perceptible and in others it is more pronounced; but this may be due to causes other than a decline in the stock of fish, such as a shortage of bait supply, dogfish movements, or a decline in the number of fishermen. The variations in catch generally, or in certain parts was as noticeable before trawler fishing commenced, as after. I cannot say that there is any visible depletion of the cod and haddock in shore fishing areas, because of trawler fishing, or that any periodic decline in the supply is due to that cause. Continuous fishing by trawlers in narrow waters or restricted areas might very sensibly diminish the quantity of fish, or even exhaust such waters. There is said to be a decline in the quantities of fish taken in the North Sea and contiguous waters; but the prevailing view is that this is because of overfishing. In view of the proscribed areas for trawler fishing, it cannot confidently be said that fishing on the outer banks by Nova Scotia trawlers has caused a decline in the quantity of cod and haddock on or near the shores of the Maritime Provinces.

Representations were made to the Commission that the shore haddock fishery of eastern Nova Scotia had definitely declined in recent years; the operation of the trawler on the offshore banks was said to be the cause of this. Evidence was given that trawlers not infrequently take quite considerable quantities of undersized haddock, which, even if returned at once to the water, were largely in such a condition as to preclude survival. Of the fish of commercial importance taken by the trawler, the haddock, on account of its habits, would be the one most likely to be adversely affected. Notwithstanding the much larger number of United States trawlers operating on the offshore banks in the waters known sometimes as the Gulf of Maine, the haddock has been taken in the Bay of Fundy in recent years, in greater quantities than was usual for a long preceding period. It is impossible to say that any decline in the shore haddock fishery, in certain areas, can be definitely attributed to the operation of trawlers; and there is no statistical support for the claim that the haddock shows signs of overfishing in the waters frequented by trawlers.

The haddock fishery is for the most part an international one. The offshore fishing grounds from Cap Cod to Newfoundland is the natural home of the haddock on this side of the Atlantic. If there is any depletion of the haddock fishery it is a matter of international concern, and the prevention of depletion is to be effected only by international regulation. Accordingly, I recommend that this question be made the subject of international investigation, in order to ascertain what regulatory measures should be applied to avoid the possible depletion of the haddock fishery. I further recommend, that in the meantime the Biological Board extend the scope of the investigations it has been conducting into the life history of the haddock.

It was suggested at many places that trawler fishing should be restricted to certain winter months. It is to be doubted if this would in any appreciable degree meet the general objections to trawler fishing, and whether or not it is practical has not been shown. It was also suggested that the trawler fishing should be prohibited during the spawning season of ground fish. The cod and haddock, or any other fish, is not unfit for human food on this account, though not in as good a condition as at other periods. A prejudice prevails in some places against the use of some spawning fish, but not against all spawning fish. I am informed that this is frequently due to the belief that the creamy substance sometimes found between the air bladder or sounds, and the bone, chiefly

in haddock, is characteristic of all spawning cod or haddock. I am informed by competent authority that this condition is of parasitical origin and may occur at any season, and is not characteristic of spawning fish.

It was stated to the Commission that the decline in the number of shore fishermen was attributable to the trawler, and that its effect was to force this class of fishermen to abandon their occupation, or to pursue it without proper reward. While it is regrettably true that there has been a decline in the total number of men engaged in the shore fisheries, it is difficult to say to what extent this is attributable to the trawler, if at all, without a very careful and detailed canvass of the affected parts and the ascertainment of the exact cause. That of course cannot be inferred from fishery statistics; they do not pretend to impart such information. The trawlers of Nova Scotia do not, I think, salt and dry any fish, and their fish is not in competition with shore caught dried fish; therefore the trawler could not adversely affect this branch of the industry any more than it would the lobster fishery. If any have abandoned the dried fish branch of the industry, with the intention of marketing their fish fresh, then they were not displaced by the trawler; they may feel the effect of the competition of trawler fish in the fresh fish markets, but this is another question to be considered. The trawler owner claims, that he made possible the present extensive fresh fish markets for the shore fishermen, but this is also another question. According to fishery statistics there has been a gradual decrease in the number of shore fishermen as well as deep-sea fishermen, in the Maritime Provinces, but such statistics are not necessarily proof of the fact for which they are frequently used. For example, the Commission was informed that in 1927, it was necessary to procure 500 fishermen from Newfoundland to man in part the Lunenburg bank fleet. This would seem to indicate that a corresponding number of Nova Scotia fishermen were not available for this fishery. This could not have been attributable to the trawler. The catch of cod and haddock for fresh fish markets by shore fishermen, is greater than at any time in the past. While no statistics are available on the point, it is extremely likely that more men are now engaged in that branch of fishing than ever before, particularly in Nova Scotia. The decline in the number of fishermen from 1890 to 1911-12 in Nova Scotia, was from 28,244 to 21,661, this was greater than the decline from 1911-12 to 1927, which was 21,661 to 16,127; and it was during this latter period that the trawler came into regular use. Since 1924, the number engaged has been maintained fairly well, and it is said that 1928 will likely show an increase over last year. In 1923 there was a marked decrease in the number of men engaged in the fisheries. This was largely due to the effect of a change in the United States tariff on fresh and frozen fish. The decline in the number of fishermen in Shelburne County was quite marked in 1923, as compared with 1922; in 1922 the number was 2,187 and in 1923 it was 1,694. In Yarmouth County the number was 1,380 in 1922 and 1,137 in 1923; in Queens County it was 642 in 1922 and 441 in 1923. The total decline in the number of fishermen in the whole Province of Nova Scotia in 1923, as compared with 1922, was 2,753, or one-half of the total decline which took place between 1911-12 and 1927, and the cause in part at least, is quite clear. In the fifteen year period 1897 to 1912, before trawlers were operating in a substantial way, the decline in the number of boat fishermen receiving the bounty was 3,218; for the next fifteen year period 1912 to 1927, the decline was 1,989. The total number of boat fishermen receiving bounty in 1897 was 12,542, in 1912 it was 9,324, in 1927 it was 7,335. The statistics do not shed any light whatever upon the alleged decline in the number of cod and haddock fishermen for fresh fish markets, and it is to this particular branch of the industry that the trawler is said to be harmful. There were many causes contributing to the decline in the total number of shore fishermen. It should always be kept in mind that fishing with

many is only a secondary occupation, and frequently when fishing was abandoned, it was because the principal occupation or employment was for some reason abandoned. There has been a decline in the number employed in the fisheries as in other occupations, due to general economic conditions, to a shifting of population from fishing sections to the cities or towns, and to migration elsewhere. The decline may have been due in some degree to a deliberate abandonment of fishing and the choice of another occupation. But whatever the decline or its causes may be, it is regrettable. It seems difficult however to assert with confidence that the trawler has been the cause of a decline in the number employed in the fresh fish branch of the industry; the contrary is likely the fact. It may frankly be admitted that altogether trawler fishing produces general economic and social changes. It may be true that in some parts the number engaged in the fresh fish industry has decreased; in other parts it may have increased.

Changes from the dried fish to the fresh fish industry, from frozen fish to iced fresh fish, changes in forms of marketing, and demands of consumers, together with other fundamental economic changes affecting the whole country, cause dislocation in industry for a time. In the conflict between the forces of tradition and those of change, many are embarrassed. For example, the Commission was frequently informed that shore fishermen, still engaged in the dried fish business had suffered even in the passing away of the country merchant, who carried fishing supplies and bought and sold local fish. In addition to the problems arising from changes in the methods of industry or business, there is always the economic one, of competition. An objection often urged against the use of the trawler was, that owing to its capacity for large and regular production, there was always the menace of overloaded markets. When analyzed, all the various objections to the trawler appear to have their origin in the economic factor of competition; this has been always the real cause of complaint against every innovation in methods and appliances for the production of fish or other products. It is considerations of general economic conditions that usually bring about enquiries into matters of this kind, and not usually the ascribed reasons.

It is to be constantly remembered that opposition to the trawler relates to its use as a producer of cod and haddock for fresh fish markets. The operators of trawlers, whose business primarily is producing, buying and marketing fresh fish, assert that the present fresh fish markets in Canada and elsewhere for Maritime Provinces fish, were largely developed by them; that these markets can only be held with the assistance of the trawler; and if it is prohibited these markets would be substantially lost for all producers. That view is put forward upon the ground that the holding of these markets depends upon a sufficient and regular supply of fish, which they say is only possible by using the trawler to augment the catch of boat and vessel fishermen. If boat and vessel fishermen alone cannot substantially retain the present markets of Quebec, Ontario, Western Canada, and the United States, or even portions of these markets, then the matter of over production or competition is not of the same importance. If that contention has foundation, then fresh fish could only be marketed within the Maritime Provinces, with perhaps irregular or seasonal shipments to other markets; the volume of production would necessarily fall. If production did not fall, there would be a return to the practice of salting and drying the larger portion of the production, for another class of markets. This view must be considered.

If Canadian trawlers were prohibited from fishing, there is some ground for the opinion that boat and vessel fishermen of the Maritime Provinces would be unable to meet the requirements of present markets. Wholesale dealers in Montreal and Toronto are of that opinion. Their opinion is based upon the principle that a regular supply of fish is always necessary to retain any market;

that if by reason of lack of ample facilities for production, adverse weather conditions, or any other cause, a regular supply failed to reach the market, competition would be invited from outside; repeated occurrences of this failure would encourage the competition, and the markets would gradually fall to those who could with unfailing regularity supply the demand. It is said fish products are not different in this respect from other products; regularity of supply being always a condition necessary to the retention of markets. The Commission was told in Montreal by two wholesale dealers, that during a period of twenty days in the month of February last, no fresh cod or haddock was procurable anywhere in Canada, except those caught by trawlers. During a period of three weeks of the past winter, only about 7,000 lbs. of cod and haddock were landed at Lockeport, where conditions for winter shore fishing are more favourable than elsewhere on the Nova Scotia coast. The Commission was informed at Lunenburg that a trawler was there under construction, and the reason given by the owners was, that the trawler was necessary to insure a regular supply of fresh fish at all seasons of the year. The shore winter fishing area on the Nova Scotia coast is very limited in extent; and if stormy weather makes fishing impossible at one point, similar conditions are likely to prevail over the remainder of the area. Were it not for trawlers, during portions of the past winter months, dealers in Montreal and Toronto would have been obliged to purchase their supplies in the United States. It was to meet such contingencies that the trawler was introduced. If the requisite supply of fish were always forthcoming with regularity from boats and vessels, it is not probable that capital would be unnecessarily invested in trawlers. The cost of production of fish by trawlers is said to be greater than that by boats and vessels. To say that the production of fresh fish by boats and vessels could be increased so as to supply with regularity the present market requirements, has not been satisfactorily demonstrated. It is a prediction that might not be fulfilled unless vessels and boats adopted methods of catching fish other than those now employed. One may safely say that there is doubt as to the capacity of boat and vessel fishermen, as at present equipped, to produce with regularity throughout the year the supply necessary to hold the fresh fish markets of Quebec and Ontario, and graver doubts still as to their capacity for some years to meet the requirements of all fresh fish markets supplied today from the Maritime Provinces. If the market demands continue to expand in the same proportion as in recent years the situation would be more doubtful still. Upon the ground of probability alone, the experience of the past would make it seem uncertain that these markets could be held without the aid of the trawler.

The fishing coast of the Maritime Provinces has most varied conditions, which must not be overlooked in a consideration of the fresh fish industry and the use of trawlers. In the southwestern counties of Nova Scotia, in the region of Cape Sable and in sections of the Bay of Fundy, fish can be caught comparatively near the shore and practically throughout the entire year; except when prevented by unfavourable weather conditions. At present there are no trawlers operating from the ports of southwestern Nova Scotia or the Bay of Fundy. In the Gulf of St. Lawrence, the ports are blocked with ice for months, so that fishing of any kind is impossible during that period. Between these two regions, along the coast of eastern Nova Scotia, the harbours are practically always open, but for several months during the winter season inshore fishing fails, and fish are only to be found on certain of the outer banks. On this eastern section of the Nova Scotia coast, the trawler has come into use, primarily to provide a steady supply of fish throughout the year; it probably was first introduced only for winter fishing. The trawler would appear necessary if the fresh fish markets are to be in part supplied from this section of the coast. Therefore, in the whole of the Maritime Provinces, it is only on the coastline west of Halifax that winter shore fishing is carried on, and even within that area it is carried on

only in a few places in any substantial way. Whatever may be the full reasons, the fact remains that in the fresh fish industry the three companies that operate trawlers have their principal plants in eastern Nova Scotia. In spite of unfavourable fishing and weather conditions during parts of the year, they have provided regular supplies of fish for distant markets. Lacking trawlers, or equally efficient means of providing a steady supply of fish, eastern Nova Scotia must fall behind in production compared with other fishing sections of that province, and of the New England States. That is some justification for the use of trawlers, at least in eastern Nova Scotia. It is extremely doubtful if the shore fishermen of this section who claim to suffer from the operations of the trawlers, would win a fruitful victory by the prohibition of the trawler. The competition will not be eliminated, and though it may come from other parts it will be equally effective; existing marketing organizations of some value to the fishermen of this section of the coast may be lost, and they cannot easily be replaced. The shore fisherman may improve his position by more continuous operations, but whether by small trawlers, seines or other suitable equipment cannot be stated. In the meanwhile, the prohibition of the trawler may prove a great loss to him because it may weaken or destroy the strongest buying and marketing organizations now available to him. Even west of Halifax, some seem to think that the trawler is necessary to the regular conduct of the fresh fish business. Apparently that is the view at Lunenburg. At Lockeport, the use of the trawler or something equally effective seems to be regarded always as a possibility of the future; possibly that was why no shipper there would go so far as to suggest that the trawler should be prohibited, only that it should be Canadian owned. It may later be found that, in western Nova Scotia as well as in eastern Nova Scotia, the trawler or some other efficient means is a necessary factor to secure regularity in production—particularly in the winter season,—which regularity is a necessary factor if the present fresh fish markets are to be retained.

The companies using trawlers are buyers as well as producers of fish. In 1926 the trawlers produced about 40,000,000 lbs. of fresh fish out of a total production of about 90,000,000 lbs. in the Maritime Provinces; boat and vessel fishermen produced in the same period about 50,000,000 lbs. of which 36,000,000 lbs., or 72 per cent, was purchased and marketed by the companies operating trawlers. Of the total production by trawlers, boats and vessels, 45,000,000 lbs. was marketed west of Ontario and in the United States, largely it is said by companies relying partially on trawlers for their supply. When we consider the limitation of the winter fishing areas of the Maritime Provinces coast; the number of shore fishermen excluded from continuous fishing by winter conditions; the occasional non-productive periods in the more favorable areas owing to weather conditions; the greater consumption of fish in the winter months; the seasonal character of the cod and haddock fisheries and their temporary cessation because of other fisheries, such as the lobster, which is permissible only at fixed periods, the matter of regularity in production and marketing becomes one of very substantial importance. It is not clear to me that the present market requirements can be supplied, without the present combination of methods of production; nor am I satisfied that for a considerable time the total supply required can be produced by boat and vessel fishermen alone. I perceive many difficulties attending efforts to build up storage reserves in the favourable fishing season for the full annual requirements, though conceivably this may gradually come to pass. For these reasons, and others that I have mentioned, I cannot censure in the recommendation made by my colleagues concerning the prohibition of trawlers, and I must therefore very respectfully dissent from them upon this point.

Anomalous conditions will prevail if Canadian trawlers are prohibited from operating on the fishing banks, which foreign trawlers may do. Canadian

trawlers will be prevented from taking, in international waters, fish intended for foreign dried fish markets; they will be prevented from there taking fish intended solely for United States or other foreign markets; all of this the trawlers of other countries may do.

Complaints were made to the Commission, particularly at Lunenburg, N.S., concerning the damage done to line trawls and fishing gear by Canadian and foreign trawlers. Such damage occurs in international waters. This being the case, regulations to effectively alleviate or end these complaints must be the subject of international action. In the North Sea, where fishermen of many nations are engaged in fishing, it was found necessary to regulate the manner and methods of fishing, and to police the fishing areas. To achieve this end a convention between Great Britain, Germany, Belgium, Denmark, France and Holland was entered into, in 1882. It is said that this convention has in a large degree accomplished its purpose. For the same reason, as well as others to be later mentioned, I would recommend that the Government of Canada take the proper steps to secure, if possible, an international conference representative of the countries whose citizens fish on the North Atlantic fishing grounds, with a view to the enactment of international regulations governing the operation of trawlers in these waters, and the punishment of offences against such regulations. It is not necessary to suggest in detail what such regulations should comprise. In the meantime, I would recommend that regulations be enacted requiring Canadian trawlers to be lettered and numbered in a conspicuous way, in order to assist in their prompt identification; the letter and number should be registered.

The known and dependable facts do not indicate that the trawler is destructive of the feeding grounds of the cod and haddock, or that it is exhausting or depleting the large fishing areas of the North Atlantic. However, considering the manner in which these fisheries are likely to be carried on in the future, tending gradually to intensiveness of fishing, questions may soon arise for consideration by the countries interested in the conservation of the fish supply to be found in these waters. The old idea, still too generally accepted, that the resources of the sea are almost inexhaustible, is no longer held by anyone informed on the subject. There is nothing at present known which would indicate any early depletion from any causes whatever, but that feeling or conclusion is perhaps not based on any well founded data. Little is known of the life history and migration of the cod and haddock, and much scientific work remains to be done in this direction. It is important also to determine whether certain fishing grounds can withstand unregulated fishing by trawlers; how trawlers may be regulated or controlled; and what areas if any should be closed to trawler fishing. In any event, it is desirable that these and other questions should be scientifically investigated and studied at an early date. This can best be accomplished by international effort. For this reason I would suggest that appropriate steps be taken by the Government of Canada to bring about, if possible, the creation of some international body to carry on work of this nature.

It is desirable for several reasons that trawlers, fishing out of and landing their catch in Canadian ports should be subject to regulation. To regulate them effectively it is necessary that they be of Canadian registry, and I so recommend. I might recommend that Canadian ownership be also required, but that could be so easily evaded, that no useful or practical results would follow.

Wholesale and retail dealers of fresh fish in the large consuming centres, appear willing to pay at the coast such a price for fish as would yield a remunerative return to fishermen and shippers, which, neither of them seems to be receiving at present. The wholesalers and retailers cannot be expected to resist purchasing their supplies below the desirable level of prices, if and when

offered to them. Nova Scotia shippers are responsible for market quotations which depress the market price below a remunerative level. The severe and unrestrained competition between shippers, is the cause of market disturbances which react adversely upon fishermen as well as on themselves. They strike at one another sometimes by elevating prices to fishermen in certain localities beyond the point warranted by general market conditions; and again, by cutting prices at the points of large consumption below the cost to themselves.

Some degree of co-operation among shippers would seem necessary in their own interest and in that of the fishermen. There would not seem to be any economic objection to co-operative efforts in this direction, and if attempted in the proper spirit, the difficulties would not seem insurmountable. The two methods of production of fresh fish referred to seem necessary, and if so, the more essential is it for shippers to co-operate in some form of marketing association, or something of that nature. While those operating trawlers may have their rights to assert, they have their duties to perform as well. It is their duty as much as that of others, to assist in the promotion of the welfare of all sections of society. The number of trawlers in use should not exceed that number which will produce from time to time, the market requirements in excess of boat and vessel production. The interest of trawler owners and general public interests would be best served by such a policy, and no sacrifice would be required in its adoption. It is difficult to do this by any form of licensing; this would involve discrimination by the licensing authorities and would be difficult of administration. This can best be done by the trawler users themselves.

The foregoing was prepared before I had seen in detail the report of my colleagues, and on the assumption that their recommendation involved merely the prohibition of trawlers fishing from Canadian ports, as Canadian fishing vessels. However, the recommendation of the report is that all trawlers of any registry be prohibited from landing fish in Canadian ports, or from using any Canadian port as a base of supply for fishing operations. This recommendation seems to go beyond the spirit of the terms of reference and beyond any request made to the Commission. I do not propose here to discuss the full effect of this recommendation.

A. K. MACLEAN.

APPENDIX No. I

FRANCIS A. ANGLIN,
Deputy Governor General.

CANADA

(Great Seal)

W. STUART EDWARDS,
 Deputy Minister of Justice
 Canada.

GEORGE THE FIFTH, by the Grace of God of Great Britain, Ireland and the British Dominions beyond the Seas KING, Defender of the Faith, Emperor of India. TO ALL TO WHOM these presents shall come, or whom the same may in anywise concern,

GREETING:

WHEREAS pursuant to the provisions of Part I of the Inquiries Act, Revised Statutes of Canada, 1906, Chapter 104, His Excellency the Governor General in Council by Order P.C. 1955 $\frac{1}{2}$ of the 7th day of October, 1927, copy of which is hereto annexed, has authorized the appointment of the Commissioners therein and hereinafter named to investigate and report upon, concerning, and for all and singular the matters and purposes therein mentioned or described.

NOW KNOW YE, that by and with the advice of Our Privy Council for Canada, We do by these Presents nominate, constitute and appoint the Honourable ALEXANDER KENNETH MACLEAN, President of the Exchequer Court of Canada; HENRY RYDER LOCKE BILL, *Esquire*, of Lockeport, in the Province of Nova Scotia; The Honourable JOSEPH GEORGE MONBOURQUETTE, of L'Ardoise, in the Province of Nova Scotia; Professor CYRUS MACMILLAN, Master of Arts, Doctor of Philosophy, of Montreal, in the Province of Quebec; and JOHN GEORGE ROBICHAUD, *Esquire*, of Shippigan, in the Province of New Brunswick, to be Our Commissioners to investigate and report upon, concerning, and for all and singular the matters and purposes upon, as to and for which you are by the aforesaid Order in Council authorized to investigate and report.

TO HAVE, HOLD, EXERCISE AND ENJOY the said office, place and trust unto the said ALEXANDER KENNETH MACLEAN, HENRY RYDER LOCKE BILL, JOSEPH GEORGE MONBOURQUETTE, Professor CYRUS MACMILLAN and JOHN GEORGE ROBICHAUD, together with the rights, powers, privileges and emoluments unto the said office, place and trust, of right and by-law appertaining, during pleasure.

AND WE DO FURTHER constitute and appoint you the said the Honourable Alexander Kenneth MacLean to be Chairman of the said Commission.

AND WE DO HEREBY, under the authority of the Revised Statute respecting Inquiries concerning Public Matters, confer upon Our said Commissioners, the power of summoning before them any witnesses and of requiring them to give evidence on oath, or on solemn affirmation if they are persons entitled to affirm in civil matters, and orally or in writing, and to produce such documents and things as Our said Commissioners shall deem requisite to the full investigation of the matters into which they are hereby appointed to examine.

AND WE DO HEREBY require and direct Our said Commisioners to report to Our Governor General in Council the result of their investigation together with the evidence taken before them and any opinion they may see fit to express thereon.

IN TESTIMONY WHEREOF, We have caused these Our Letters to be made Patent and the Great Seal of Canada to be hereunto affixed, WITNESS:—

Our Right Trusty and Well-beloved Counsellor the Right Honourable Francis Alexander Anglin, Chief Justice of Canada, and Deputy of Our Right Trusty and Well-beloved Cousin Freeman Viscount Willingdon, Knight Grand Commander of Our Most Exalted Order of the Star of India, Knight Grand Cross of Our Most Distinguished Order of Saint Michael and Saint George, Knight Grand Commander of Our Most Eminent Order of the Indian Empire, Knight Grand Cross of Our Most Excellent Order of the British Empire, Governor General and Commander-in-Chief of Our Dominion of Canada.

At our Government House, in Our City of Ottawa, this seventh day of October, in the year of Our Lord one thousand nine hundred and twenty-seven and in the eighteenth year of Our Reign.

By Command,

G. R. SHIBLEY,
Acting Under-Secretary of State.

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ATLANTIC COAST OF CANADA

PRINCIPAL FISHING BANKS

MARINE & FISHERIES DEPT.
FISHERIES BRANCH
-1928-

SCALE
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Statute miles.



NOTE: Figures on banks indicate areas in square geographical miles.

TABLE OF DISTANCES.
C From principal fishing ports to principal fishing banks.

PORTS	BANKS			
	GREAT	SABLE IS.	BANQUEREAU	GEORGES
NORTH SYDNEY	440	160	140	466
CANSO	465	88	113	360
HALIFAX	588	159	225	256
LUNENBURG	607	177	244	231
LOCKEPORT	653	213	280	165
YARMOUTH	727	284	355	147
DIGBY	812	370	440	220
PORTLAND	884	438	508	180
BOSTON	928	470	555	172

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BOSTON

APPENDIX
TO THE
REPORT OF THE
COMMISSIONER OF THE
LAND OFFICE
FOR THE YEAR
1887

APPENDIX No. III

LOBSTER CANNED AND IN THE SHELL

Year	Nova Scotia		New Brunswick		Prince Edward Island		Quebec		Total	
	1 lb. cans	Cwt. in shell	1 lb. cans	Cwt. in shell	1 lb. cans	Cwt. in shell	1 lb. cans	Cwt. in shell	1 lb. cans	Cwt. in shell
1897.....	5,214,266	229,682	2,413,404	22,055	2,466,682	.....	1,036,202	94	11,130,554	251,831
1898.....	5,210,294	326,313	2,113,222	21,776	2,340,020	.....	1,067,058	201	10,730,504	348,364
1899.....	4,837,402	134,462	2,177,106	19,965	2,421,144	46	1,059,658	125	10,495,310	154,598
1900.....	5,263,780	169,196	2,038,692	19,729	2,223,712	135	1,022,106	80	10,548,290	189,140
1901.....	5,003,023	146,488	1,842,340	17,605	2,386,070	32	825,171	70	10,056,604	164,195
1902.....	4,637,204	120,902	1,965,296	20,853	2,039,603	224	708,018	55	9,350,121	142,034
1903.....	5,153,712	88,586	2,136,672	17,545	2,335,400	400	978,434	108	10,604,218	106,639
1904.....	5,357,454	92,513	2,055,100	16,882	2,501,100	1,533	848,634	120	10,762,288	111,048
1905.....	4,917,148	134,871	2,249,440	18,520	2,182,624	350	1,148,412	183	10,497,624	153,924
1906.....	4,595,816	87,956	2,420,860	12,889	2,289,288	440	798,800	85	10,104,764	101,370
1907.....	4,270,326	84,279	2,731,012	12,401	2,839,489	720	819,723	90	10,660,550	97,490
1908.....	4,399,610	87,321	2,716,968	10,317	3,098,444	530	696,476	205	10,911,438	98,373
1909-10.....	3,794,422	81,960	2,078,660	19,089	2,255,898	1,850	941,620	1,048	9,071,600	103,947
1910-11.....	3,960,336	93,871	1,676,736	14,736	2,180,784	350	970,704	1,055	8,788,560	110,012
1911-12.....	4,631,904	98,659	1,807,872	11,171	2,481,264	633	1,086,096	360	10,007,136	110,823
1912-13.....	4,049,952	71,816	1,358,640	13,418	2,630,304	.....	966,672	145	9,005,568	85,379
1913-14.....	4,197,552	84,063	1,220,128	16,716	1,783,632	.....	791,280	100	7,992,592	100,879
1914-15.....	3,665,760	75,883	1,394,160	10,966	1,733,632	.....	543,840	150	7,723,344	86,824
1915-16.....	3,774,336	107,366	1,450,992	11,692	2,082,944	187	504,096	84	7,822,368	119,339
1916-17.....	4,055,328	72,040	2,098,800	11,995	2,668,560	99	669,360	864	9,492,048	84,998
1917.....	3,764,448	64,096	2,090,352	19,603	2,976,000	112	576,864	758	9,407,664	84,569
1918.....	2,541,264	49,435	819,264	9,472	1,290,240	19	524,208	325	5,174,976	59,251
1919.....	2,962,272	65,593	923,568	19,533	1,531,728	20	762,862	194	6,180,430	85,340
1920.....	3,804,144	55,217	1,177,536	13,514	1,985,456	.....	921,216	269	7,838,352	69,000
1921.....	3,324,240	93,115	1,073,088	23,664	1,495,440	1,437	712,368	621	6,605,136	118,837
1922.....	3,098,496	45,504	1,251,696	17,701	2,026,560	3,104	758,160	1,190	7,134,912	67,499
1923.....	3,070,608	46,161	1,252,704	21,277	2,103,888	9,740	822,672	2,721	7,249,872	79,899
1924.....	1,959,888	34,550	1,130,304	26,809	1,687,008	6,650	524,400	1,025	4,901,664	69,034
1925.....	2,579,760	63,690	1,307,328	12,541	1,267,808	10,272	554,960	1,313	6,079,876	87,816
1926.....	2,701,296	71,688	1,153,968	15,861	1,413,216	3,153	660,432	847	5,928,912	91,549

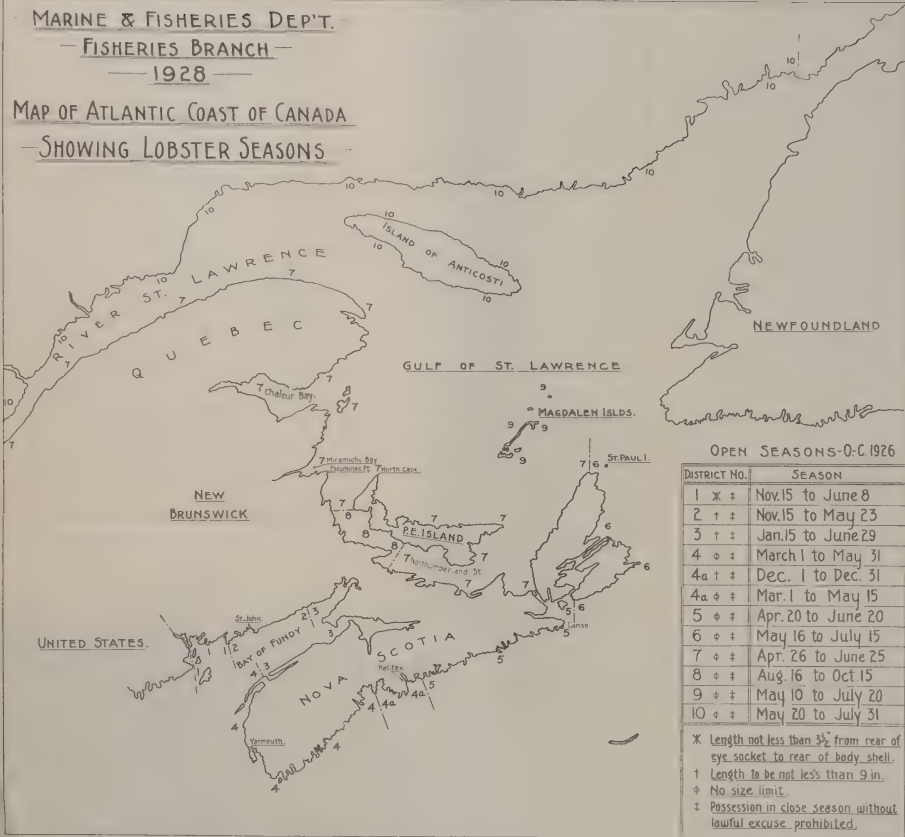
MARINE & FISHERIES DEPT.

- FISHERIES BRANCH -

1928

MAP OF ATLANTIC COAST OF CANADA

- SHOWING LOBSTER SEASONS -



APPENDIX No. V

QUANTITY and value of Catch of Salmon in the Maritime Provinces and Quebec for the years 1917 to 1926.

	Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Totals
	cwts.	cwts.	cwts.	cwts.	cwts.
1917.....	10,285	15,983	65	13,532	39,865
1918.....	8,500	17,452	30	11,139	37,121
1919.....	4,533	9,668	22	5,807	20,030
1920.....	3,361	11,477	.....	4,927	19,765
1921.....	6,284	20,383	.....	7,805	34,472
1922.....	8,577	16,859	19	12,206	37,661
1923.....	11,217	20,682	34	14,765	46,698
1924.....	10,127	33,563	62	15,080	58,832
1925.....	8,422	30,073	90	20,714	59,299
1926.....	13,428	25,131	164	15,536	54,259

APPENDIX No. VI

STATEMENT showing the number of boats operated, the fathoms of net fished, from 1907 to 1926 in salmon drifting in Miramichi Bay

Year	Boats	Total fathoms fished	Catch Cwts.
1907.....	4	2,400	
1908.....	6	3,600	
1909.....	10	6,000	
1910.....	15	7,000	
1911.....	17	7,600	
1912.....	20	12,000	
1913.....	20	12,000	
1914.....	20	12,000	
1915.....	25	15,000	
1916.....	35	20,000	
1917.....	45	25,000	
1918.....	45	25,000	
1919.....	45	25,000	
1920.....	48	27,000	
1921.....	48	27,000	
1922.....	49	27,800	8,857
1923.....	50	30,000	4,458
1924.....	50	30,000	6,137
1925.....	52	35,000	3,534
1926.....	52	35,000	2,817

STATEMENT showing the number of set net stands licensed in Miramichi Bay and River from 1922 to 1927, and the catch for the years 1922 to 1926

NUMBER OF SET STANDS IN BAY AND RIVER

	Stands	Catch Cwts.
1922.....	220	3,522
1923.....	215	3,946
1924.....	213	6,195
1925.....	266	4,430
1926.....	288	3,162
1927.....	181	

APPENDIX No. VII

An estimate of the annual catch of fishing vessels sailing from ports in Lunenburg County, N.S. for the years 1896 to 1927, both inclusive

Year	Lunenburg	Riverport	Mahone Bay	La Have	Total No.
	Quintals	Quintals	Quintals	Quintals	Quintals
1896.....	200,000		15,000	67,630	282,630
1897.....	115,400		22,670	75,210	213,280
1898.....	121,530		20,600	59,000	201,130
1899.....	110,600		18,600	61,500	190,700
1900.....	151,000		30,480	85,300	266,780
1901.....	125,630		23,900	77,000	224,530
1902.....	139,230		32,000	95,000	266,230
1903.....	116,000		32,600	76,600	226,200
1904.....	69,250		16,230	46,000	131,480
1905.....	87,430		11,830	50,200	149,460
1906.....	66,420	16,450	15,470	29,300	127,640
1907.....	42,610		10,120	18,850	71,580
1908.....	72,780	17,130	11,530	15,100	106,540
1909.....	88,380	27,600	19,800	34,750	170,530
1910.....	114,000	32,200	17,900	22,000	186,100
1911.....	125,430	30,800	14,700	36,250	207,180
1912.....	134,600	42,840	17,750	36,930	232,120
1913.....	115,000	12,570	12,050	26,400	166,020
1914.....	117,120	31,750	11,000	36,790	196,660
1915.....	93,510	11,720	7,700	36,550	149,480
1916.....	125,650	28,710	12,400	49,120	215,880
1917.....	132,730	25,000	9,150	41,200	208,080
1918.....	145,000	36,900	8,800	56,390	247,090
1919.....	160,000	34,800	4,500	38,170	237,470
1920.....	200,350	38,540	11,700	51,270	301,860
1921.....	184,300	35,140	20,950	62,000	302,390
1922.....	168,460	46,000	12,680	44,760	271,900
1923.....	218,270	63,900	21,200	75,920	379,290
1924.....	176,680	30,100	9,220	59,820	275,820
1925.....	191,690	47,000	7,550	24,800	271,040
1926.....	224,360	60,100	9,250	62,700	356,410
1927.....					239,375

APPENDIX No. VIII

STATEMENT of the number of vessels fishing out of Lunenburg County, Nova Scotia, from 1896 to 1927;
both inclusive

Year	Lunenburg	La Have	Riverport	Mahone Bay	Total
1896.....	64	36		11	111
1897.....	60	35		13	108
1898.....	73	30		14	117
1899.....	74	42		15	131
1900.....	80	45		17	142
1901.....	77	47		15	139
1902.....	78	46		18	142
1903.....	76	45		20	141
1904.....	77	46		19	142
1905.....	73	38	20	18	149
1906.....	56	30	19	19	124
1907.....	54	27	12	12	105
1908.....	55	27	14	18	114
1909.....	60	16	12	12	100
1910.....	70	21	11	15	117
1911.....	90	21	20	13	144
1912.....	93	18	16	11	138
1913.....	89	25	13	8	135
1914.....	90	32	14	12	148
1915.....	88	36	17	17	158
1916.....	95	30	9	7	141
1917.....	87	27	19	8	141
1918.....	92	30	21	6	149
1919.....	90	27	20	6	143
1920.....	88	32	19	10	149
1921.....	72	25	21	7	125
1922.....	80	29	24	7	140
1923.....	70	21	16	3	110
1924.....	58	14	12	3	87
1925.....	54	23	12	2	91
1926.....	47	20	19	3	89
1927.....	66	9	7	2	84

Grand Total 1927

APPENDIX No. IX

AN ESTIMATE OF THE LANDINGS EACH TRIP OF FISHING VESSELS SAILING OUT OF LUNENBURG COUNTY, N.S., AND
THE AVERAGE PRICE PAID PER QUINTAL EACH TRIP FOR THE YEARS 1911 TO 1927, BOTH INCLUSIVE

Year	Early Spring	Average price		Spring	Average price		First trip handline	Average price		Summer	Average price		Total	Average price	
		\$	cts.		\$	cts.		\$	cts.		\$	cts.		\$	cts.
1911.....	6,000	7	00	57,000	6	75	12,000	5	90	144,000	6	50	219,000	6	55
1912.....	3,000	.....	.....	Incomplete	4	00	Incomplete	5	00	114,000	6	20	211,000	5	50
1913.....	2,300	6	70	57,000	6	70	17,000	6	50	130,000	6	00	206,000	6	25
1914.....	7,600	7	50	27,200	7	50	20,500	7	25	80,000	7	00	135,000	7	15
1915.....	20,100	6	38	57,300	6	40	23,300	6	00	109,500	5	50	210,200	5	75
1916.....	10,375	7	10	47,700	7	10	17,350	7	25	118,000	7	90	193,000	7	50
1917.....	18,550	10	00	38,700	10	00	16,800	10	00	159,500	10	00	233,500	10	00
1918.....	28,220	11	00	38,400	12	75	24,100	13	00	148,000	15	00	238,000	13	96
1919.....	26,400	14	0	47,200	12	00	26,600	12	00	193,000	12	00	293,000	12	18
1920.....	29,600	12	50	56,000	9	25	16,000	9	25	184,200	7	50	285,800	8	93
1921.....	3,300	6	80	59,500	6	80	4,700	6	75	199,400	6	75	267,000	6	76
1922.....	45,600	7	75	75,750	7	75	16,800	7	25	179,250	6	50	316,400	7	02
1923.....	21,400	5	75	35,600	5	75	6,800	5	80	124,000	7	00	187,800	6	58
1924.....	29,000	8	00	41,200	7	00	6,000	8	90	98,000	10	60	174,200	9	26
1925.....	40,300	7	00	45,275	7	00	15,350	7	40	160,000	8	00	260,900	7	64
1926.....	49,600	5	50	61,400	5	50	16,400	5	25	220,000	5	00	347,400	5	17
1927.....	30,000	6	35	50,500	6	00	7,700	6	25	145,000	6	75	233,200	6	45

APPENDIX No. X

AN ESTIMATE of the average price paid per quintal, from 1896 to 1927 (both inclusive) for dried cod fish caught and landed by fishing vessels sailing from Lunenburg County, Nova Scotia.

1896.....	\$	2 75	1912.....	\$	5 35
1897.....		2 40	1913.....		6 50
1898.....		3 40	1914.....		6 50
1899.....		3 50	1915.....		6 25
1900.....		3 30	1916.....		7 37
1901.....		3 50	1917.....		9 80
1902.....		3 30	1918.....		13 62½
1903.....		4 35	1919.....		12 65
1904.....		4 90	1920.....		8 10
1905.....		6 00	1921.....		6 40
1906.....		4 90	1922.....		6 3
1907.....		4 90	1923.....		6 100
1908.....		3 30	1924.....		8 62
1909.....		4 50	1925.....		7 50
1910.....		5 60	1926.....		7 50
1911.....		6 30	1927.....		6 25

APPENDIX No. XI

AN ESTIMATE of the average amount received by sharesman on fishing vessels sailing from Lunenburg County, Nova Scotia, for each year from 1896 to 1927, both inclusive.

1896.....	\$	86 00	1912.....	\$	265 00
1897.....		127 00	1913.....		290 00
1898.....		129 00	1914.....		205 00
1899.....		216 00	1915.....		191 00
1900.....		190 00	1916.....		649 00
1901.....		140 00	1917.....		840 00
1902.....		188 00	1918.....		1,234 00
1903.....		165 00	1919.....		1,200 00
1904.....		194 00	1920.....		485 00
1905.....		206 00	1921.....		446 00
1906.....		205 00	1922.....		408 00
1907.....		250 00	1923.....		574 00
1908.....		156 00	1924.....		701 00
1909.....		230 00	1925.....		932 00
1910.....		300 00	1926.....		567 00
1911.....		490 00	1927.....		518 00

APPENDIX No. XII

AN ESTIMATE of the cost of outfitting fishing vessels sailing from Lunenburg County, Nova Scotia, from 1896 to 1927, both inclusive.

1896.....	\$	976 00	1912.....	\$2,002 00
1897.....		831 00	1913.....	1,676 00
1898.....		866 00	1914.....	1,814 00
1899.....		834 00	1915.....	1,658 00
1900.....		995 00	1916.....	2,370 00
1901.....		995 00	1917.....	3,020 00
1902.....		1,034 00	1918.....	4,432 00
1903.....		1,055 00	1919.....	5,850 00
1904.....		970 00	1920.....	5,200 00
1905.....		1,130 00	1921.....	3,902 00
1906.....		1,115 00	1922.....	3,876 00
1907.....		1,428 00	1923.....	2,851 00
1908.....		1,550 00	1924.....	3,021 00
1909.....		1,415 00	1925.....	3,926 00
1910.....		1,370 00	1926.....	4,652 00
1911.....		1,580 00	1927.....	3,656 00
1911.....		1,770 00		

NOTE.—“This estimate includes the cost of salt, provisions, lines and ship chandlery but does not include anchors, dories or bait.”

